

Supplement to

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A Computationally Assisted Reconstruction of an Ontological Argument in Spinoza's *The Ethics*

SOME NOTES ON THE APPENDICES

How to read the models in the mace4 outputs in the Appendices

This section describes how to read mace4 outputs *for the purposes of the Appendices*. *It is not a specification of mace4's behavior*.

Figure A is an excerpt from Appendix 11.

```
===== Mace4 =====
. . .
===== end of head =====

===== INPUT =====
assign(iterate_up_to,10).
% assign(iterate_up_to, 10) -> assign(end_size, 10).
set(print_models_tabular).
% set(print_models_tabular) -> clear(print_models).

formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

. . .

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:
1 SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) # label("Definition I:
self-caused") # label(non_clause). [assumption].
. . .

end_of_list.

===== CLAUSES FOR SEARCH =====
```

```

formulas(mace4_clauses).
-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-caused").
. . .
end_of_list.
===== end of clauses for search =====
. . .
===== DOMAIN SIZE 2 =====

. . .

SelfCaused :
    0 1
-----
    0 0
. . .

Exiting with 1 model.
. . .

```

Figure A. An excerpt from the *mace4* output shown in Appendix 11. “. . .” indicates that I deleted text in *mace4*’s output at this location.

Refer to Figure A. Given the way *mace4* executions are configured for this paper, a *mace4* output has several sections. In the order they appear, these sections include:

1. a processing header, whose beginning delimiter contains the string “Mace 4” and whose ending delimiter contains the string “end of head”. This section contains software version number information, process and platform identifiers, a run date-time, and part of the command string used to invoke *mace4*. You don’t need this information to be able to informally understand the models *mace4* produces, but it is useful for configuration management purposes.
2. an input section, whose beginning delimiter contains the string “INPUT” and whose ending delimiter contains the string “end of input”. This section echos the content of the file input to *mace4*. It is useful for reference and configuration management purposes, but typically you will not need it to informally understand the models *mace4* produces.
3. a list of “non-clausal formulas” that occur in the “INPUT” section. The beginning delimiter of the “non-clausal formulas” section contains the string “PROCESS NON-CLAUSAL FORMULAS” is a list the formulas in the “INPUT” section that *mace4* will translate to a logically equivalent clausal form that facilitates *mace4*’s search for a model. Understanding the details of the translation from formulas of the kind that appear in the “INPUT” section to *mace4*’s clausal form is not required for an informal understanding

the models *mace4* produces. *mace4* translates all the formulas in the “INPUT” section into that clausal form.

4. a clausal translation section, whose beginning delimiter contains the string “CLAUSES FOR SEARCH” and whose ending delimiter contains the string “end of clauses for search”. This section contains *mace4*’s translation of the formulas described in (3) to *mace4*’s clausal form. In order to show that such a sentence is “true”, it suffices to show that at least one disjunct in that set is true.
5. a model-description section that is produced if *mace4* finds a model. The model-description section has a beginning delimiter that contains the string “DOMAIN SIZE n” (where n is an integer greater than 0; in the example, n = 2). This model-description section contains the fundamental description of the model of interest. Further information on how to read this section are contained in the narrative below.
6. a process-exit summary, only a portion of which (“Exiting with 1 model”) is shown in Figure 2. For the purposes of an informal understanding of the models that *mace4* produces, the phrase “Exiting with 1 model” is important. It confirms that *mace4* has found a model. If *mace4* executed correctly, that information is sufficient to show that there is a model of the set of sentences (in the example, the information shows that the DAPI conjoined with the negation of (GE)) has a model.

If the phrase “Exiting with 1 model” in the process-exit summary (see (6) above) is sufficient to convince you that a model of *mace4*’s input exists, you can skip the remainder of the narrative in this section (Section 2.1).

Else, here’s a sketch of how to “manually” confirm that *mace4* has found a model of input.

First, consider a sentence in the input to *mace4*. For illustration, let’s choose the first such sentence

```
SelfCaused(x) <-> EssenceInvExistence(x) &  
NatureConcOnlyByExistence(x)
```

in the PROCESS NON-CLAUSAL FORMULAS section of the *mace4* output. Note that this sentence comes directly from Figure 1.

mace4 translates this sentence into a sequence of sentences, and reports that translation in the CLAUSES FOR SEARCH section. The first sentence in that translation happens to be

```
-SelfCaused(x) | EssenceInvExistence(x)
```

In the DOMAIN SIZE 2 section, locate the subheader

SelfCaused :

Under the “SelfCaused :” subheader, the first line lists the possible values *mace4* has determined that variable *x* could be assigned in this model. Under the (*x* =) “0” and under the (*x* =) “1” that occurs above the dashed line, the value “0” appears below the dashed line. This means that *mace4* has assigned the expression “SelfCaused (0)” and “SelfCaused(1) ” the value “0”, which *for the purposes of the example*, we can interpret as “SelfCaused (0)’ and ‘SelfCaused(1)’ are assigned the truth-value FALSE”. That is, under this assignment, the first disjunct of

$$\neg \text{SelfCaused}(x) \mid \text{EssenceInvExistence}(x)$$

is “TRUE” for all possible values of *x* (0 or 1). Thus, at least one disjunct in the sentence shown is TRUE, and therefore that entire sentence is TRUE. That means that under the assignment mentioned,

$$\neg \text{SelfCaused}(x) \mid \text{EssenceInvExistence}(x)$$

is satisfied by the model *mace4* produces in this example.

Repeat the procedure sketched above for all the sentences in the CLAUSES FOR SEARCH section. If all these sentences evaluate to TRUE, there is a model for the INPUT section for *mace4*, or equivalently, all the formulas in the INPUT section have a model.

Because all the *mace4* scripts in the Appendices are highly similar to the one in Appendix 11, they can all be interpreted by following the rubric sketched above.

How to read the *prover9* outputs in these Appendices

Here's an example of how to read the *prover9* outputs contained in these Appendices. Figure B is an abstraction of the proof shown in Appendix 8.

Refer to Figure B, which contains an excerpt from the *prover9* output corresponding to the input file listed in Figure 9 in the body of the manuscript.

```
===== Prover9 =====
Prover9 (32) version 2009-11A, November 2009.
Process 1752 was started by #AUTHOR on DESKTOP-AM4IKPU,
Tue May 7 08:51:53 2019
The command was "../bin/prover9".
===== end of head =====

===== INPUT =====

formulas(assumptions).

SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) #
label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) # label("Definition
III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI: God").
```

```

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y))
# label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII:
eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) ->
-EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in
common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom
VII").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in
itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has being,
then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x has
essence, then x exists").

God(a).

end_of_list.

formulas(goals).

```

Exists(a) # label("Prop. XI: God exists").

end_of_list.

===== end of input =====

. . .

===== PROOF =====

% Proof 1 at 0.03 (+ 0.05) seconds.

% Length of proof is 27.

% Level of proof is 5.

. . .

1 SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) #
label("Definition I: self-caused") # label(non_clause). [assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) # label("Definition
III: substance") # label(non_clause). [assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI: God") #
label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

18 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in
itself, x is self-caused") # label(non_clause). [assumption].

19 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has being,
then x has essence") # label(non_clause). [assumption].

20 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x has
essence, then x exists") # label(non_clause). [assumption].

21 Exists(a) # label("Prop. XI: God exists") # label(non_clause) #
label(goal). [goal].

23 -SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused"). [clausify(1)].

25 -InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in
itself, x is self-caused"). [clausify(18)].

30 -Substance(x) | InItself(x) # label("Definition III: substance").
[clausify(3)].

35 -AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely
infinite"). [clausify(7)].

56 -God(x) | Being(x) # label("Definition VI: God"). [clausify(6)].

57 -God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").
[clausify(6)].

58 God(a). [assumption].

63 -AbsolutelyInfinite(x) | InItself(x). [resolve(35,b,30,a)].

70 AbsolutelyInfinite(a). [resolve(58,a,57,a)].

85 Being(a). [resolve(58,a,56,a)].

86 -Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being,
then x has essence"). [clausify(19)].

87 -InItself(x) | EssenceInvExistence(x). [resolve(25,b,23,a)].

88 -EssenceInvExistence(x) | -HasEssence(x) | Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x has
essence, then x exists"). [clausify(20)].

100 InItself(a). [resolve(70,a,63,a)].

101 -InItself(x) | -HasEssence(x) | Exists(x). [resolve(87,b,88,a)].

110 -Exists(a) # label("Prop. XI: God exists"). [deny(21)].

135 HasEssence(a). [resolve(85,a,86,a)].

150 -HasEssence(a) | Exists(a). [resolve(101,a,100,a)].

151 \$F. [copy(150),unit_del(a,135),unit_del(b,110)].

===== end of proof =====

. . .

=====
===== end of search =====

THEOREM PROVED

Exiting with 1 proof.

. . .

Figure B. An extract from the proof of (GE) that is generated by *prover9*, using the file shown in Figure 9 as input. The full output of *prover9* for this case is contained in Appendix 8. “. . .” signifies text in the original that I deleted.

Here’s how to read Figure B.

prover9 first translates some of the input file (in this case, the DAPI, together with a proposition to be derived) to a set of sentences in a specific clausal form that is logically equivalent to sentences input to *prover9*.

Locate the PROOF section in Figure B. Each of the clausal sentences in the PROOF section of Figure B is part of a translation of *prover9*’s inputs to *prover9*’s clausal form. Each line in the proof begins with a line number. The line numbers of the first few lines in the proof shown in Figure B, for example, are “1”, “3”, and “6”. (It is not significant that the line numbers have some “gaps”.)

By default, *prover9* proofs are proofs by contradiction. Here’s a narrative of the details of the PROOF section in Figure 10. x and y are variables and are universally quantified. *prover9* universally converts “ $P \rightarrow Q$ ” to “ $\neg P \mid Q$ ”. The “resolution inference rule” mentioned below is a generalization of modus ponens (see Leitsch, *Resolution Calculus*, for further detail).

Line 1. x is self-caused if and only if x ’s essence involves existence, and that of which the nature is only conceivable as existent. (from Df. I of “self-caused”)

Line 3. x is substance if and only if x is in itself and conceived through itself. (from Df. III of “substance”)

Line 6. x is God if and only if x is a being and x is absolutely infinite. (from Df. VI of “God”)

Line 7. x is absolutely infinite if and only if x is substance and x consists in infinite attributes, and each attribute expresses eternal and infinite essentiality. (from Df. VI of “absolutely infinite”)

Line 18. If x is in itself, x is self-caused. (from Auxiliary Assumption 4)

Line 19. If x has being, x has essence. (from Auxiliary Assumption 7)

Line 20. If the essence of x involves existence and x has essence, x exists. (from Auxiliary Assumption 8)

Line 21. a Exists. (This is a statement of the proposition that will be proven, i.e., it is a “goal”, not an assumption, of the derivation. a is asserted to be God at Line 58)

Line 23. x is not self-caused or x 's essence involves x 's existence. (This follows from Line 1.)

Line 25. x is not in itself or x is self-caused. (This follows from Line 18.)

Line 30. x is not substance or x is in itself. (This follows from Line 3.)

Line 35. x is not absolutely infinite or x is substance (This follows from Line 7.)

Line 56. x is not God or x has being. (This follows from Line 6.)

Line 57. x is not God or x is absolutely infinite. (This follows from Line 6.)

Line 58. Let a be God.

Line 63. x is not absolutely infinite or x is in itself. (This follows from Lines 35 and 30 by the resolution inference rule.)

Line 70. a is absolutely infinite. (This follows from Lines 58 and 57 by the resolution inference rule.)

Line 85. a has being. (This follows from Lines 58 and 56 by the resolution inference rule.)

Line 86. x does not have being or x has essence. (This follows from Line 19.)

Line 87. x is not in itself or x 's essence involves its existence. (This follows from Lines 25 and 23 by the resolution inference rule.)

Line 88. x 's essence does not involve its existence or x does not have essence or x exists. (This follows from Line 20.)

Line 100. a is in itself. (This follows from Lines 70 and 63 by the resolution inference rule.)

Line 101. x is not in itself or x does not have essence or x exists. (This follows from Lines 87 and 88 by the resolution inference rule.)

Line 110. **a** does not exist. (This is the negation of the goal of the derivation (see Line 21).)

Line 135. **a** has essence. (This follows from Lines 85 and 86 by the resolution inference rule.)

Line 150. **a** does not have essence or **a** exists. (This follows from Lines 101 and 100 by the resolution inference rule.)

Line 151. From Lines 135 and 150 it follows that that **a** exists. That result contradicts Line 110. Thus, by proof by contradiction, the negation of Line 21 is not the case. Therefore, **a**, i.e, God (see Line 58), exists. QED.

APPENDIX 1. A *mace4* model that shows the independence of (GE) from the DAPI.

```
===== Mace4 =====
```

```
Mace4 (32) version 2009-11A, November 2009.
```

```
Process 1625 was started by #AUTHOR on DESKTOP-AM4IKPU,
```

```
Wed May 8 13:22:30 2019
```

```
The command was "../bin/mace4".
```

```
===== end of head =====
```

```
===== INPUT =====
```

```
assign(iterate_up_to,10).
```

```
    % assign(iterate_up_to, 10) -> assign(end_size, 10).
```

```
set(print_models_tabular).
```

```
    % set(print_models_tabular) -> clear(print_models).
```

```
formulas(theory).
```

```
SelfCaused(x) <-> EssenceInvExistence(x) &  
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
```

```
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #  
label("Definition II: finite after its kind").
```

```
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #  
label("Definition III: substance").
```

```
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:  
attribute").
```

```
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &  
ConceivedThru(x,z) # label("Definition V: mode").
```

```
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:  
God").
```

```
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &  
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
```

ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

God(a).

-Exists(a) # label("deny God exists*").

end_of_list.

==== end of input =====

==== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

```

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

```

```

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite
after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III:
substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

```

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
III").

```

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

God(a).

-Exists(a) # label("deny God exists*").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

a : 0

AbsolutelyInfinite :

    0 1
-----

```

1 0

Attribute :

0 1

0 0

Being :

0 1

1 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

1 0

ConstInInfAttributes :

0 1

1 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :

```
    0 1
-----
    0 0
Free :
    0 1
-----
    0 0
God :
    0 1
-----
    1 0
InItself :
    0 1
-----
    1 0
IntPercAsConstEssSub :
    0 1
-----
    0 0
IsMethodAction :
    0 1
-----
    0 0
IsMethodExistence :
    0 1
-----
    0 0
```

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

1 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

--+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=198, kept=189.

Selections=98, assignments=98, propagations=35, current_models=1.

Rewrite_terms=2, rewrite_bools=256, indexes=2.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 1625 exit (max_models) Wed May 8 13:22:30 2019

The process finished Wed May 8 13:22:30 2019

APPENDIX 2. A *mace4* model that shows the independence of (SE) from the DAPI.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 11712 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 14:45:59 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
assign(iterate_up_to,10).
    % assign(iterate_up_to, 10) -> assign(end_size, 10).
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
```

```

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

-(Substance(x) -> Exists(x)) # label("deny SE").

end_of_list.

===== end of input =====
===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

```

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

```

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 -(Substance(x) -> Exists(x)) # label("deny SE") #
label(non_clause). [assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite
after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III:
substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

```

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
 label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
 label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
 -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
 necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
 VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
 label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
 label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
 label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
 III").

```

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) # label("deny SE").

-Exists(x) # label("deny SE").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

    0 1
-----
    0 0

```

Attribute :

0 1

0 0

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

1 1

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

```
-----  
    0 0  
Free :  
    0 1  
-----  
    0 0  
God :  
    0 1  
-----  
    0 0  
InItself :  
    0 1  
-----  
    1 1  
IntPercAsConstEssSub :  
    0 1  
-----  
    0 0  
IsMethodAction :  
    0 1  
-----  
    0 0  
IsMethodExistence :  
    0 1  
-----  
    0 0  
KnowledgeOfACause :
```

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

1 1

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.03 seconds).

Ground clauses: seen=200, kept=191.

Selections=98, assignments=98, propagations=34, current_models=1.

Rewrite_terms=0, rewrite_bools=260, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.03, System_CPU=0.01, Wall_clock=0.

Exiting with 1 model.

Process 11712 exit (max_models) Sat Mar 9 14:45:59 2019

The process finished Sat Mar 9 14:45:59 2019

APPENDIX 3. A *mace4* model that shows that Auxiliary Assumption 1 is independent of the DAPI conjoined with Auxiliary Assumptions 4, 7, and 8.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 1196 was started by #AUTHOR on DESKTOP-AM4IKPU,
Fri Mar 8 11:06:20 2019
The command was "../bin/mace4".
===== end of head =====

===== INPUT =====

assign(iterate_up_to,10).
    % assign(iterate_up_to, 10) -> assign(end_size, 10).
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).

formulas(theory).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
```

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI: God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) & (AttributeOf(y,x) -> ExpressesEternalEssentiality(y) & ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

-(Substance(x) -> Being(x)) # label("Negate -- Auxiliary assumption 1: if x is a substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) # label("Definition I: self-caused") # label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) # label("Definition II: finite after its kind") # label(non_clause). [assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) # label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV: attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) & ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause). [assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI: God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) & (AttributeOf(y,x) -> ExpressesEternalEssentiality(y) & ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free") # label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |

```

IsMethodExistence(y) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 -(Substance(x) -> Being(x)) # label("Negate -- Auxiliary assumption
1: if x is a substance, x is a being") # label(non_clause).
[assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====

```

===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) # label("Negate -- Auxiliary assumption 1: if x is a
substance, x is a being").

-Being(x) # label("Negate -- Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0
Being :
0 1

0 0
CanBeConceivedAsNonExisting :
0 1

0 0
ConceivedThruItself :
0 1

1 1
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

1 1
Eternity :

0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

1 1

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

1 1

Necessary :

0 1

0 0

SelfCaused :

0 1

1 1

Substance :

0 1

1 1

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

CorrespondWith :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByDefiniteMethod :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByFixedMethod :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByItselfAlone :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

EffectNecessarilyFollowsFrom :

```
| 0 1
```


---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

--+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=206, kept=195.

Selections=92, assignments=92, propagations=42, current_models=1.

Rewrite_terms=0, rewrite_bools=270, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 1196 exit (max_models) Fri Mar 8 11:06:20 2019

The process finished Fri Mar 8 11:06:20 2019

APPENDIX 4. A *mace4* model that shows that Auxiliary Assumption 4 is independent of the DAPI conjoined with Auxiliary Assumptions 1, 7, and 8.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 12588 was started by #AUTHOR on DESKTOP-AM4IKPU,
Fri Mar  8 11:08:32 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
assign(iterate_up_to,10).
    % assign(iterate_up_to, 10) -> assign(end_size, 10).
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
```

ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-(InItself(x) -> SelfCaused(x)) # label("Negate Auxiliary assumption 4: if x is in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

==== end of input =====

==== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) # label("Definition I: self-caused") # label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) # label("Definition II: finite after its kind") # label(non_clause). [assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) # label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV: attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) & ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause). [assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI: God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) & (AttributeOf(y,x) -> ExpressesEternalEssentiality(y) & ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free") # label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary") # label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity") # label(non_clause). [assumption].

```

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 -(InItself(x) -> SelfCaused(x)) # label("Negate Auxiliary
assumption 4: if x is in itself, x is self-caused") #
label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

```

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
 label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
 label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
 III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other. ").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other. ").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
 Things which have nothing in common cannot be understood, the one by
 means of the other. ").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

InItself(x) # label("Negate Auxiliary assumption 4: if x is in itself, x is self-caused").

-SelfCaused(x) # label("Negate Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :
0 1

```
-----  
    0 0  
God :  
    0 1  
-----  
    0 0  
HasEssence :  
    0 1  
-----  
    0 0  
InItself :  
    0 1  
-----  
    1 1  
IntPercAsConstEssSub :  
    0 1  
-----  
    0 0  
IsMethodAction :  
    0 1  
-----  
    0 0  
IsMethodExistence :  
    0 1  
-----  
    0 0  
KnowledgeOfACause :
```

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=206, kept=197.

Selections=104, assignments=104, propagations=30, current_models=1.

Rewrite_terms=0, rewrite_bools=264, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 12588 exit (max_models) Fri Mar 8 11:08:32 2019

The process finished Fri Mar 8 11:08:32 2019

APPENDIX 5. A *mace4* model that shows that Auxiliary Assumption 7 is independent of the DAPI conjoined with Auxiliary Assumptions 1, 4, and 8.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 6120 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 10:57:00 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
assign(iterate_up_to,10).
    % assign(iterate_up_to, 10) -> assign(end_size, 10).
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
```

ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-(Being(x) -> HasEssence(x)) # label("Deny Auxiliary assumption 7: If x has being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) # label("Definition I: self-caused") # label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) # label("Definition II: finite after its kind") # label(non_clause). [assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) # label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV: attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) & ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause). [assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI: God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) & (AttributeOf(y,x) -> ExpressesEternalEssentiality(y) & ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free") # label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary") # label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.") # label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused") # label(non_clause). [assumption].

20 -(Being(x) -> HasEssence(x)) # label("Deny Auxiliary assumption 7: If x has being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists") # label(non_clause). [assumption].

==== end of process non-clausal formulas ====

==== CLAUSES FOR SEARCH ====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
 label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
 label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
 III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other. ").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other. ").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
 Things which have nothing in common cannot be understood, the one by
 means of the other. ").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

Being(x) # label("Deny Auxiliary assumption 7: If x has being, then x has essence").

-HasEssence(x) # label("Deny Auxiliary assumption 7: If x has being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

1 1

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :
0 1

0 0
God :
0 1

0 0
HasEssence :
0 1

0 0
InItself :
0 1

0 0
IntPercAsConstEssSub :
0 1

0 0
IsMethodAction :
0 1

0 0
IsMethodExistence :
0 1

0 0
KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=206, kept=195.

Selections=102, assignments=102, propagations=32, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 6120 exit (max_models) Sat Mar 9 10:57:00 2019

The process finished Sat Mar 9 10:57:00 2019

APPENDIX 6. A *mace4* model that shows that Auxiliary Assumption 8 is independent of the DAPI conjoined with Auxiliary Assumptions 1, 4, and 7.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 6712 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 10:58:44 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
assign(iterate_up_to,10).
    % assign(iterate_up_to, 10) -> assign(end_size, 10).
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
```

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) & (AttributeOf(y,x) -> ExpressesEternalEssentiality(y) & ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

```
-(EssenceInvExistence(x) & HasEssence(x) -> Exists(x)) # label("Deny  
Auxiliary assumption 8: if the essence of x involves the existence of  
x and x has essence, then x exists").
```

```
end_of_list.
```

```
===== end of input =====
```

```
===== PROCESS NON-CLAUSAL FORMULAS =====
```

```
% Formulas that are not ordinary clauses:
```

```
1 SelfCaused(x) <-> EssenceInvExistence(x) &  
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #  
label(non_clause). [assumption].
```

```
2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #  
label("Definition II: finite after its kind") # label(non_clause).  
[assumption].
```

```
3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #  
label("Definition III: substance") # label(non_clause). [assumption].
```

```
4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:  
attribute") # label(non_clause). [assumption].
```

```
5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &  
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).  
[assumption].
```

```
6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:  
God") # label(non_clause). [assumption].
```

```
7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &  
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &  
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely  
infinite") # label(non_clause). [assumption].
```

```
8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->  
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #  
label(non_clause). [assumption].
```

```
9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &  
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |  
IsMethodExistence(y)) # label("Definition VII: necessary") #  
label(non_clause). [assumption].
```

```
10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #  
label("Definition VIII: eternity") # label(non_clause). [assumption].
```

```

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 -(EssenceInvExistence(x) & HasEssence(x) -> Exists(x)) #
label("Deny Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====

===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

```

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
 label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
 label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
 III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other. ").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other. ").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
 Things which have nothing in common cannot be understood, the one by
 means of the other. ").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

EssenceInvExistence(x) # label("Deny Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

HasEssence(x) # label("Deny Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

-Exists(x) # label("Deny Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

1 1

Eternity :

0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :

```
    0 1
-----
    0 0
God :
    0 1
-----
    0 0
HasEssence :
    0 1
-----
    1 1
InItself :
    0 1
-----
    0 0
IntPercAsConstEssSub :
    0 1
-----
    0 0
IsMethodAction :
    0 1
-----
    0 0
IsMethodExistence :
    0 1
-----
    0 0
```

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

--+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.00 seconds).

Ground clauses: seen=208, kept=199.

Selections=100, assignments=100, propagations=34, current_models=1.

Rewrite_terms=0, rewrite_bools=272, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.00, System_CPU=0.05, Wall_clock=0.

Exiting with 1 model.

Process 6712 exit (max_models) Sat Mar 9 10:58:44 2019

The process finished Sat Mar 9 10:58:44 2019

APPENDIX 7. Summary of a *prover9* derivation of (SE) from the DAPI conjoined with Auxiliary Assumptions 1, 4, 7, and 8.

```
===== Prover9 =====
Prover9 (32) version 2009-11A, November 2009.
Process 3824 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:28:27 2019
The command was "../bin/prover9".
===== end of head =====
===== INPUT =====

formulas(assumptions).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
```

ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

```
EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").
```

```
end_of_list.
```

```
formulas(goals).
```

```
Substance(x) -> Exists(x) # label("SE: if x is substance, x exists").
```

```
end_of_list.
```

```
===== end of input =====
```

```
===== PROCESS NON-CLAUSAL FORMULAS =====
```

```
% Formulas that are not ordinary clauses:
```

```
1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].
```

```
2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].
```

```
3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].
```

```
4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].
```

```
5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].
```

```
6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].
```

```
7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].
```

```
8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].
```

```
9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
```

```

IsMethodExistence(y) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

22 Substance(x) -> Exists(x) # label("SE: if x is substance, x
exists") # label(non_clause) # label(goal). [goal].

```

```

===== end of process non-clausal formulas =====
===== PROCESS INITIAL CLAUSES =====

% Clauses before input processing:

formulas(usable).

end_of_list.

formulas(sos).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused"). [clausify(1)].

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused"). [clausify(1)].

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
[clausify(1)].

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind"). [clausify(2)].

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite
after its kind"). [clausify(2)].

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind"). [clausify(2)].

-Substance(x) | InItself(x) # label("Definition III: substance").
[clausify(3)].

-Substance(x) | ConceivedThruItself(x) # label("Definition III:
substance"). [clausify(3)].

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance"). [clausify(3)].

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV:
attribute"). [clausify(4)].

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV:
attribute"). [clausify(4)].

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V:
mode"). [clausify(5)].

```


-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode"). [clausify(5)].

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode"). [clausify(5)].

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode"). [clausify(5)].

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode"). [clausify(5)].

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode"). [clausify(5)].

-God(x) | Being(x) # label("Definition VI: God"). [clausify(6)].

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God"). [clausify(6)].

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God"). [clausify(6)].

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite"). [clausify(7)].

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite"). [clausify(7)].

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite"). [clausify(7)].

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite"). [clausify(7)].

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite"). [clausify(7)].

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite"). [clausify(7)].

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free"). [clausify(8)].

```

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free"). [clausify(8)].

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free"). [clausify(8)].

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").
[clausify(8)].

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").
[clausify(9)].

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary"). [clausify(9)].

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary"). [clausify(9)].

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary"). [clausify(9)].

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary"). [clausify(9)].

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary"). [clausify(9)].

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity"). [clausify(10)].

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity"). [clausify(10)].

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").
[clausify(11)].

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").
[clausify(11)].

Exists(x) | -ExistsIn(x,x) # label("Axiom I"). [clausify(11)].

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").
[clausify(11)].

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").
[clausify(12)].

```

ConceivedThru(x,x) | y != x # label("Axiom II"). [clausify(12)].

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III"). [clausify(13)].

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other."). [clausify(15)].

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other."). [clausify(15)].

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other."). [clausify(15)].

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other."). [clausify(15)].

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI"). [clausify(16)].

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI"). [clausify(16)].

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII"). [clausify(17)].

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being"). [clausify(18)].

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused"). [clausify(19)].

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence"). [clausify(20)].

```

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists"). [clausify(21)].

Substance(c1) # label("SE: if x is substance, x exists"). [deny(22)].

-Exists(c1) # label("SE: if x is substance, x exists"). [deny(22)].

end_of_list.

formulas(demodulators).

end_of_list.

```

===== PREDICATE ELIMINATION =====

Eliminating SelfCaused/1

```

23 SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
[clausify(1)].

24 -SelfCaused(x) | EssenceInvExistence(x) # label("Definition I:
self-caused"). [clausify(1)].

25 -SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition
I: self-caused"). [clausify(1)].

26 -InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused"). [clausify(19)].

Derived: -InItself(x) | EssenceInvExistence(x). [resolve(26,b,24,a)].

Derived: -InItself(x) | NatureConcOnlyByExistence(x).
[resolve(26,b,25,a)].

```

Eliminating FiniteAfterItsKind/1

```

27 FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind"). [clausify(2)].

28 -FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition
II: finite after its kind"). [clausify(2)].

29 -FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II:
finite after its kind"). [clausify(2)].

Derived: -CanBeLimitedBy(x,y) | -SameKind(x,y) | CanBeLimitedBy(x,z).
[resolve(27,a,28,a)].

```

Derived: $\neg \text{CanBeLimitedBy}(x, y) \mid \neg \text{SameKind}(x, y) \mid \text{SameKind}(x, z)$.
[resolve(27, a, 29, a)].

Eliminating Substance/1

30 Substance(x) | $\neg \text{InItself}(x) \mid \neg \text{ConceivedThruItself}(x)$ #
label("Definition III: substance"). [clausify(3)].

31 $\neg \text{Substance}(x) \mid \text{InItself}(x)$ # label("Definition III: substance").
[clausify(3)].

32 $\neg \text{Substance}(x) \mid \text{ConceivedThruItself}(x)$ # label("Definition III:
substance"). [clausify(3)].

33 $\neg \text{Mode}(x) \mid \text{Substance}(y) \mid \text{ExistsIn}(x, z)$ # label("Definition V:
mode"). [clausify(5)].

Derived: $\neg \text{Mode}(x) \mid \text{ExistsIn}(x, y) \mid \text{InItself}(z)$.
[resolve(33, b, 31, a)].

Derived: $\neg \text{Mode}(x) \mid \text{ExistsIn}(x, y) \mid \text{ConceivedThruItself}(z)$.
[resolve(33, b, 32, a)].

34 $\neg \text{Mode}(x) \mid \text{Substance}(y) \mid \text{ConceivedThru}(x, z)$ # label("Definition V:
mode"). [clausify(5)].

Derived: $\neg \text{Mode}(x) \mid \text{ConceivedThru}(x, y) \mid \text{InItself}(z)$.
[resolve(34, b, 31, a)].

Derived: $\neg \text{Mode}(x) \mid \text{ConceivedThru}(x, y) \mid \text{ConceivedThruItself}(z)$.
[resolve(34, b, 32, a)].

35 $\text{Mode}(x) \mid \neg \text{Modification}(x, y) \mid \neg \text{Substance}(y)$ # label("Definition V:
mode"). [clausify(5)].

Derived: $\text{Mode}(x) \mid \neg \text{Modification}(x, y) \mid \neg \text{InItself}(y) \mid$
 $\neg \text{ConceivedThruItself}(y)$. [resolve(35, c, 30, a)].

Derived: $\text{Mode}(x) \mid \neg \text{Modification}(x, y) \mid \neg \text{Mode}(z) \mid \text{ExistsIn}(z, u)$.
[resolve(35, c, 33, b)].

Derived: $\text{Mode}(x) \mid \neg \text{Modification}(x, y) \mid \neg \text{Mode}(z) \mid \text{ConceivedThru}(z, u)$.
[resolve(35, c, 34, b)].

36 $\neg \text{AbsolutelyInfinite}(x) \mid \text{Substance}(x)$ # label("Definition VI:
absolutely infinite"). [clausify(7)].

Derived: $\neg \text{AbsolutelyInfinite}(x) \mid \text{InItself}(x)$. [resolve(36, b, 31, a)].

Derived: $\neg \text{AbsolutelyInfinite}(x) \mid \text{ConceivedThruItself}(x)$.
[resolve(36,b,32,a)].

Derived: $\neg \text{AbsolutelyInfinite}(x) \mid \text{Mode}(y) \mid \neg \text{Modification}(y,x)$.
[resolve(36,b,35,c)].

37 $\text{AbsolutelyInfinite}(x) \mid \neg \text{Substance}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\text{AttributeOf}(y,x) \# \text{label}(\text{"Definition VI: absolutely infinite"})$.
[clausify(7)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\text{AttributeOf}(y,x) \mid \neg \text{InItself}(x) \mid \neg \text{ConceivedThruItself}(x)$.
[resolve(37,b,30,a)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\text{AttributeOf}(y,x) \mid \neg \text{Mode}(z) \mid \text{ExistsIn}(z,u)$. [resolve(37,b,33,b)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\text{AttributeOf}(y,x) \mid \neg \text{Mode}(z) \mid \text{ConceivedThru}(z,u)$.
[resolve(37,b,34,b)].

38 $\text{AbsolutelyInfinite}(x) \mid \neg \text{Substance}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\neg \text{ExpressesEternalEssentiality}(y) \mid \neg \text{ExpressesInfiniteEssentiality}(y) \#$
 $\text{label}(\text{"Definition VI: absolutely infinite"})$. [clausify(7)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\neg \text{ExpressesEternalEssentiality}(y) \mid \neg \text{ExpressesInfiniteEssentiality}(y) \mid$
 $\neg \text{InItself}(x) \mid \neg \text{ConceivedThruItself}(x)$. [resolve(38,b,30,a)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\neg \text{ExpressesEternalEssentiality}(y) \mid \neg \text{ExpressesInfiniteEssentiality}(y) \mid$
 $\neg \text{Mode}(z) \mid \text{ExistsIn}(z,u)$. [resolve(38,b,33,b)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\neg \text{ExpressesEternalEssentiality}(y) \mid \neg \text{ExpressesInfiniteEssentiality}(y) \mid$
 $\neg \text{Mode}(z) \mid \text{ConceivedThru}(z,u)$. [resolve(38,b,34,b)].

39 $\neg \text{Substance}(x) \mid \text{Being}(x) \# \text{label}(\text{"Auxiliary assumption 1: if } x \text{ is a}$
 $\text{substance, } x \text{ is a being"})$. [clausify(18)].

Derived: $\text{Being}(x) \mid \neg \text{InItself}(x) \mid \neg \text{ConceivedThruItself}(x)$.
[resolve(39,a,30,a)].

Derived: $\text{Being}(x) \mid \neg \text{Mode}(y) \mid \text{ExistsIn}(y,z)$. [resolve(39,a,33,b)].

Derived: $\text{Being}(x) \mid \neg \text{Mode}(y) \mid \text{ConceivedThru}(y,z)$.
[resolve(39,a,34,b)].

Derived: $\text{Being}(x) \mid \neg \text{AbsolutelyInfinite}(x)$. [resolve(39,a,36,b)].

40 Substance(c1) # label("SE: if x is substance, x exists").
[deny(22)].

Derived: InItself(c1). [resolve(40,a,31,a)].

Derived: ConceivedThruItself(c1). [resolve(40,a,32,a)].

Derived: Mode(x) | -Modification(x,c1). [resolve(40,a,35,c)].

Derived: AbsolutelyInfinite(c1) | -ConstInInfAttributes(c1) |
AttributeOf(x,c1). [resolve(40,a,37,b)].

Derived: AbsolutelyInfinite(c1) | -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x).
[resolve(40,a,38,b)].

Derived: Being(c1). [resolve(40,a,39,a)].

Eliminating Attribute/1

41 Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV:
attribute"). [clausify(4)].

42 -Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV:
attribute"). [clausify(4)].

Eliminating God/1

43 God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI:
God"). [clausify(6)].

44 -God(x) | Being(x) # label("Definition VI: God"). [clausify(6)].

45 -God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").
[clausify(6)].

Eliminating AbsolutelyInfinite/1

46 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) | AttributeOf(y,x)
| -InItself(x) | -ConceivedThruItself(x). [resolve(37,b,30,a)].

47 -AbsolutelyInfinite(x) | ConstInInfAttributes(x) #
label("Definition VI: absolutely infinite"). [clausify(7)].

48 -AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesEternalEssentiality(y) # label("Definition VI: absolutely
infinite"). [clausify(7)].

49 -AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite"). [clausify(7)].

50 -AbsolutelyInfinite(x) | InItself(x). [resolve(36,b,31,a)].

51 -AbsolutelyInfinite(x) | ConceivedThruItself(x).
[resolve(36,b,32,a)].

52 -AbsolutelyInfinite(x) | Mode(y) | -Modification(y,x).
[resolve(36,b,35,c)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(46,a,48,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(46,a,49,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | Mode(z) | -Modification(z,x).
[resolve(46,a,52,a)].

53 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) | AttributeOf(y,x)
| -Mode(z) | ExistsIn(z,u). [resolve(37,b,33,b)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | -AttributeOf(w,x) | ExpressesEternalEssentiality(w).
[resolve(53,a,48,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | -AttributeOf(w,x) | ExpressesInfiniteEssentiality(w).
[resolve(53,a,49,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | InItself(x). [resolve(53,a,50,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | ConceivedThruItself(x). [resolve(53,a,51,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | Mode(w) | -Modification(w,x). [resolve(53,a,52,a)].

54 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) | AttributeOf(y,x)
| -Mode(z) | ConceivedThru(z,u). [resolve(37,b,34,b)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | -AttributeOf(w,x) |
ExpressesEternalEssentiality(w). [resolve(54,a,48,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | -AttributeOf(w,x) |
ExpressesInfiniteEssentiality(w). [resolve(54,a,49,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | InItself(x). [resolve(54,a,50,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | ConceivedThruItself(x). [resolve(54,a,51,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | Mode(w) | -Modification(w,x).
[resolve(54,a,52,a)].

55 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-InItself(x) | -ConceivedThruItself(x). [resolve(38,b,30,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(55,a,48,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(55,a,49,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | Mode(z) | -Modification(z,x).
[resolve(55,a,52,a)].

56 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ExistsIn(z,u). [resolve(38,b,33,b)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) |
-AttributeOf(w,x) | ExpressesEternalEssentiality(w).
[resolve(56,a,48,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) |

-AttributeOf(w,x) | ExpressesInfiniteEssentiality(w).
[resolve(56,a,49,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) |
InItself(x). [resolve(56,a,50,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) |
ConceivedThruItself(x). [resolve(56,a,51,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) | Mode(w)
| -Modification(w,x). [resolve(56,a,52,a)].

57 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u). [resolve(38,b,34,b)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
-AttributeOf(w,x) | ExpressesEternalEssentiality(w).
[resolve(57,a,48,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
-AttributeOf(w,x) | ExpressesInfiniteEssentiality(w).
[resolve(57,a,49,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
InItself(x). [resolve(57,a,50,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
ConceivedThruItself(x). [resolve(57,a,51,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
Mode(w) | -Modification(w,x). [resolve(57,a,52,a)].

58 Being(x) | -AbsolutelyInfinite(x). [resolve(39,a,36,b)].

Derived: Being(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) |
-InItself(x) | -ConceivedThruItself(x). [resolve(58,b,46,a)].

Derived: Being(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) |
-Mode(z) | ExistsIn(z,u). [resolve(58,b,53,a)].

Derived: Being(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) |
-Mode(z) | ConceivedThru(z,u). [resolve(58,b,54,a)].

Derived: Being(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-InItself(x) | -ConceivedThruItself(x). [resolve(58,b,55,a)].

Derived: Being(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ExistsIn(z,u). [resolve(58,b,56,a)].

Derived: Being(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u). [resolve(58,b,57,a)].

59 AbsolutelyInfinite(c1) | -ConstInInfAttributes(c1) |
AttributeOf(x,c1). [resolve(40,a,37,b)].

Derived: -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-AttributeOf(y,c1) | ExpressesEternalEssentiality(y).
[resolve(59,a,48,a)].

Derived: -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-AttributeOf(y,c1) | ExpressesInfiniteEssentiality(y).
[resolve(59,a,49,a)].

Derived: -ConstInInfAttributes(c1) | AttributeOf(x,c1) | InItself(c1).
[resolve(59,a,50,a)].

Derived: -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
ConceivedThruItself(c1). [resolve(59,a,51,a)].

Derived: -ConstInInfAttributes(c1) | AttributeOf(x,c1) | Mode(y) |
-Modification(y,c1). [resolve(59,a,52,a)].

60 AbsolutelyInfinite(c1) | -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x).
[resolve(40,a,38,b)].

Derived: -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x)
| -ExpressesInfiniteEssentiality(x) | -AttributeOf(y,c1) |
ExpressesEternalEssentiality(y). [resolve(60,a,48,a)].

Derived: -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x)
| -ExpressesInfiniteEssentiality(x) | -AttributeOf(y,c1) |
ExpressesInfiniteEssentiality(y). [resolve(60,a,49,a)].

Derived: -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x)
| -ExpressesInfiniteEssentiality(x) | InItself(c1).
[resolve(60,a,50,a)].

Derived: -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x)
| -ExpressesInfiniteEssentiality(x) | ConceivedThruItself(c1).
[resolve(60,a,51,a)].

Derived: -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x)
| -ExpressesInfiniteEssentiality(x) | Mode(y) | -Modification(y,c1).
[resolve(60,a,52,a)].

Eliminating Free/1

61 Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free"). [clausify(8)].

62 -Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free"). [clausify(8)].

63 -Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free"). [clausify(8)].

Derived: -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) |
-ActionOf(z,x) | DeterminedByItselfAlone(z,x). [resolve(61,a,63,a)].

64 Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").
[clausify(8)].

Derived: -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) | -ActionOf(z,x) |
DeterminedByItselfAlone(z,x). [resolve(64,a,63,a)].

Eliminating Necessary/1

65 Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary"). [clausify(9)].

66 -Necessary(x) | ExternalTo(y,x) # label("Definition VII:
necessary"). [clausify(9)].

67 -Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition
VII: necessary"). [clausify(9)].

68 -Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary"). [clausify(9)].

69 -Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary"). [clausify(9)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
ExternalTo(z,y). [resolve(65,a,66,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByFixedMethod(y,z). [resolve(65,a,67,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByDefiniteMethod(y,z). [resolve(65,a,68,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
IsMethodAction(z) | IsMethodExistence(z). [resolve(65,a,69,a)].

70 Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary"). [clausify(9)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
ExternalTo(z,y). [resolve(70,a,66,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
DeterminedByFixedMethod(y,z). [resolve(70,a,67,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
DeterminedByDefiniteMethod(y,z). [resolve(70,a,68,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
IsMethodAction(z) | IsMethodExistence(z). [resolve(70,a,69,a)].

Eliminating Eternity/1

71 Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity"). [clausify(10)].

72 -Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity"). [clausify(10)].

Eliminating DefiniteCause/1

Eliminating KnowledgeOfEffect/2

73 KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

74 -KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

Eliminating HaveNothingInCommon/2

Eliminating TrueIdea/1

Eliminating CanBeConceivedAsNonExisting/1

Eliminating Being/1

75 Being(x) | -InItself(x) | -ConceivedThruItself(x).
[resolve(39,a,30,a)].

76 -Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence"). [clausify(20)].

Derived: -InItself(x) | -ConceivedThruItself(x) | HasEssence(x).
[resolve(75,a,76,a)].

77 Being(x) | -Mode(y) | ExistsIn(y,z). [resolve(39,a,33,b)].

Derived: -Mode(x) | ExistsIn(x,y) | HasEssence(z).
[resolve(77,a,76,a)].

78 Being(x) | -Mode(y) | ConceivedThru(y,z). [resolve(39,a,34,b)].

Derived: -Mode(x) | ConceivedThru(x,y) | HasEssence(z).
[resolve(78,a,76,a)].

79 Being(c1). [resolve(40,a,39,a)].

Derived: HasEssence(c1). [resolve(79,a,76,a)].

80 Being(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) |
-InItself(x) | -ConceivedThruItself(x). [resolve(58,b,46,a)].

81 Being(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u). [resolve(58,b,53,a)].

82 Being(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u). [resolve(58,b,54,a)].

83 Being(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-InItself(x) | -ConceivedThruItself(x). [resolve(58,b,55,a)].

84 Being(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ExistsIn(z,u). [resolve(58,b,56,a)].

85 Being(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u). [resolve(58,b,57,a)].

Eliminating EssenceInvExistence/1

86 -InItself(x) | EssenceInvExistence(x). [resolve(26,b,24,a)].

87 -EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists"). [clausify(21)].

Derived: -InItself(x) | -HasEssence(x) | Exists(x).
[resolve(86,b,87,a)].

Eliminating InItself/1

88 -Mode(x) | ExistsIn(x,y) | InItself(z). [resolve(33,b,31,a)].

89 -InItself(x) | NatureConcOnlyByExistence(x). [resolve(26,b,25,a)].

Derived: -Mode(x) | ExistsIn(x,y) | NatureConcOnlyByExistence(z).
[resolve(88,c,89,a)].

90 -Mode(x) | ConceivedThru(x,y) | InItself(z). [resolve(34,b,31,a)].

Derived: -Mode(x) | ConceivedThru(x,y) | NatureConcOnlyByExistence(z).
[resolve(90,c,89,a)].

91 Mode(x) | -Modification(x,y) | -InItself(y) |
-ConceivedThruItself(y). [resolve(35,c,30,a)].

92 InItself(c1). [resolve(40,a,31,a)].

Derived: NatureConcOnlyByExistence(c1). [resolve(92,a,89,a)].

93 -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(46,a,48,a)].

94 -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(46,a,49,a)].

95 -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | Mode(z) | -Modification(z,x).
[resolve(46,a,52,a)].

96 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | InItself(x). [resolve(53,a,50,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesEternalEssentiality(v5). [resolve(96,e,93,c)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ExistsIn(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesInfiniteEssentiality(v5). [resolve(96,e,94,c)].

97 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | InItself(x). [resolve(54,a,50,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesEternalEssentiality(v5). [resolve(97,e,93,c)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z) |
ConceivedThru(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesInfiniteEssentiality(v5). [resolve(97,e,94,c)].

98 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(55,a,48,a)].

99 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(55,a,49,a)].

100 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | Mode(z) | -Modification(z,x).
[resolve(55,a,52,a)].

101 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) |
InItself(x). [resolve(56,a,50,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(w) |
-ExpressesInfiniteEssentiality(w) | -ConceivedThruItself(x) |
-AttributeOf(v5,x) | ExpressesEternalEssentiality(v5).
[resolve(101,f,98,d)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ExistsIn(z,u) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(w) |
-ExpressesInfiniteEssentiality(w) | -ConceivedThruItself(x) |
-AttributeOf(v5,x) | ExpressesInfiniteEssentiality(v5).
[resolve(101,f,99,d)].

102 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
InItself(x). [resolve(57,a,50,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(w) |
-ExpressesInfiniteEssentiality(w) | -ConceivedThruItself(x) |
-AttributeOf(v5,x) | ExpressesEternalEssentiality(v5).
[resolve(102,f,98,d)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -Mode(z) | ConceivedThru(z,u) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(w) |
-ExpressesInfiniteEssentiality(w) | -ConceivedThruItself(x) |
-AttributeOf(v5,x) | ExpressesInfiniteEssentiality(v5).
[resolve(102,f,99,d)].

103 -ConstInInfAttributes(c1) | AttributeOf(x,c1) | InItself(c1).
[resolve(59,a,50,a)].

Derived: -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-ConstInInfAttributes(c1) | AttributeOf(y,c1) |
-ConceivedThruItself(c1) | -AttributeOf(z,c1) |
ExpressesEternalEssentiality(z). [resolve(103,c,93,c)].

Derived: -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-ConstInInfAttributes(c1) | AttributeOf(y,c1) |

-ConceivedThruItself(c1) | -AttributeOf(z,c1) |
ExpressesInfiniteEssentiality(z). [resolve(103,c,94,c)].

104 -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x) |
-ExpressesInfiniteEssentiality(x) | InItself(c1).
[resolve(60,a,50,a)].

Derived: -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x)
| -ExpressesInfiniteEssentiality(x) | -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-ConceivedThruItself(c1) | -AttributeOf(z,c1) |
ExpressesEternalEssentiality(z). [resolve(104,d,98,d)].

Derived: -ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(x)
| -ExpressesInfiniteEssentiality(x) | -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-ConceivedThruItself(c1) | -AttributeOf(z,c1) |
ExpressesInfiniteEssentiality(z). [resolve(104,d,99,d)].

105 -InItself(x) | -ConceivedThruItself(x) | HasEssence(x).
[resolve(75,a,76,a)].

106 -InItself(x) | -HasEssence(x) | Exists(x). [resolve(86,b,87,a)].

Derived: -HasEssence(x) | Exists(x) | -Mode(y) | ExistsIn(y,z).
[resolve(106,a,88,c)].

Derived: -HasEssence(x) | Exists(x) | -Mode(y) | ConceivedThru(y,z).
[resolve(106,a,90,c)].

Derived: -HasEssence(c1) | Exists(c1). [resolve(106,a,92,a)].

Eliminating ExistsOnlyByNecessityOfOwnNature/1

Eliminating NatureConcOnlyByExistence/1

==== end predicate elimination =====

Auto_denials: (non-Horn, no changes).

Term ordering decisions:

Predicate symbol precedence: predicate_order([=,
ConstInInfAttributes, Mode, ExpressesEternalEssentiality,
ExpressesInfiniteEssentiality, ConceivedThruItself, Exists,
HasEssence, IsMethodAction, IsMethodExistence, AttributeOf, ExistsIn,
ConceivedThru, Modification, DeterminedByDefiniteMethod,
DeterminedByFixedMethod, ExternalTo, CanBeLimitedBy, SameKind]).

```

Function symbol precedence:  function_order([ c1 ]).
After inverse_order:  (no changes).
Unfolding symbols: (none).
Auto_inference settings:
    % set(paramodulation).  % (positive equality literals)
    % set(binary_resolution).  % (non-Horn)
    % set(neg_ur_resolution).  % (non-Horn, less than 100 clauses)
Auto_process settings:
    % set(factor).  % (non-Horn)
    % set(unit_deletion).  % (non-Horn)
kept:      107 -Mode(x) | Modification(x,y) | ExistsIn(x,z) #
label("Definition V: mode").  [clausify(5)].
kept:      108 -Mode(x) | Modification(x,y) | ConceivedThru(x,z) #
label("Definition V: mode").  [clausify(5)].
kept:      109 Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) #
label("Definition V: mode").  [clausify(5)].
kept:      110 -Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) #
label("Axiom I").  [clausify(11)].
          111 -Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").
[clausify(11)].
kept:      112 -Exists(x) | ExistsIn(x,x).  [copy(111),xx(c)].
kept:      113 Exists(x) | -ExistsIn(x,x) # label("Axiom I").
[clausify(11)].
kept:      114 Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").
[clausify(11)].
kept:      115 ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom
II").  [clausify(12)].
          116 ConceivedThru(x,x) | y != x # label("Axiom II").
[clausify(12)].
kept:      117 ConceivedThru(x,x).  [copy(116),xx(b)].

```

kept: 118 -Exists(c1) # label("SE: if x is substance, x exists").
[deny(22)].

kept: 119 -CanBeLimitedBy(x,y) | -SameKind(x,y) |
CanBeLimitedBy(x,z). [resolve(27,a,28,a)].

kept: 120 -CanBeLimitedBy(x,y) | -SameKind(x,y) | SameKind(x,z).
[resolve(27,a,29,a)].

kept: 121 -Mode(x) | ExistsIn(x,y) | ConceivedThruItself(z).
[resolve(33,b,32,a)].

kept: 122 -Mode(x) | ConceivedThru(x,y) | ConceivedThruItself(z).
[resolve(34,b,32,a)].

kept: 123 Mode(x) | -Modification(x,y) | -Mode(z) |
ExistsIn(z,u). [resolve(35,c,33,b)].

kept: 124 Mode(x) | -Modification(x,y) | -Mode(z) |
ConceivedThru(z,u). [resolve(35,c,34,b)].

kept: 125 ConceivedThruItself(c1). [resolve(40,a,32,a)].

kept: 126 Mode(x) | -Modification(x,c1). [resolve(40,a,35,c)].

kept: 127 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
| ExistsIn(z,u) | -AttributeOf(w,x) | ExpressesEternalEssentiality(w).
[resolve(53,a,48,a)].

kept: 128 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
| ExistsIn(z,u) | -AttributeOf(w,x) |
ExpressesInfiniteEssentiality(w). [resolve(53,a,49,a)].

kept: 129 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
| ConceivedThru(z,u) | -AttributeOf(w,x) |
ExpressesEternalEssentiality(w). [resolve(54,a,48,a)].

kept: 130 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
| ConceivedThru(z,u) | -AttributeOf(w,x) |
ExpressesInfiniteEssentiality(w). [resolve(54,a,49,a)].

kept: 131 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ExistsIn(z,u) | -AttributeOf(w,x) |
ExpressesEternalEssentiality(w). [resolve(56,a,48,a)].

kept: 132 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |

-Mode(z) | ExistsIn(z,u) | -AttributeOf(w,x) |
ExpressesInfiniteEssentiality(w). [resolve(56,a,49,a)].

kept: 133 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u) | -AttributeOf(w,x) |
ExpressesEternalEssentiality(w). [resolve(57,a,48,a)].

kept: 134 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u) | -AttributeOf(w,x) |
ExpressesInfiniteEssentiality(w). [resolve(57,a,49,a)].

kept: 135 -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-AttributeOf(y,c1) | ExpressesEternalEssentiality(y).
[resolve(59,a,48,a)].

kept: 136 -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-AttributeOf(y,c1) | ExpressesInfiniteEssentiality(y).
[resolve(59,a,49,a)].

kept: 137 -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x) |
-AttributeOf(y,c1) | ExpressesEternalEssentiality(y).
[resolve(60,a,48,a)].

kept: 138 -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x) |
-AttributeOf(y,c1) | ExpressesInfiniteEssentiality(y).
[resolve(60,a,49,a)].

kept: 139 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
ExternalTo(z,y). [resolve(65,a,66,a)].

kept: 140 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByFixedMethod(y,z). [resolve(65,a,67,a)].

kept: 141 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByDefiniteMethod(y,z). [resolve(65,a,68,a)].

kept: 142 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
IsMethodAction(z) | IsMethodExistence(z). [resolve(65,a,69,a)].

kept: 143 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
 -DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
 ExternalTo(z,y). [resolve(70,a,66,a)].

kept: 144 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
 -DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
 DeterminedByFixedMethod(y,z). [resolve(70,a,67,a)].

kept: 145 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
 -DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
 DeterminedByDefiniteMethod(y,z). [resolve(70,a,68,a)].

kept: 146 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
 -DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
 IsMethodAction(z) | IsMethodExistence(z). [resolve(70,a,69,a)].

kept: 147 -Mode(x) | ExistsIn(x,y) | HasEssence(z).
 [resolve(77,a,76,a)].

kept: 148 -Mode(x) | ConceivedThru(x,y) | HasEssence(z).
 [resolve(78,a,76,a)].

kept: 149 HasEssence(c1). [resolve(79,a,76,a)].

150 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
 | ExistsIn(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
 -ConceivedThruItself(x) | -AttributeOf(v5,x) |
 ExpressesEternalEssentiality(v5). [resolve(96,e,93,c)].

151 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
 | ExistsIn(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
 -ConceivedThruItself(x) | -AttributeOf(v5,x) |
 ExpressesInfiniteEssentiality(v5). [resolve(96,e,94,c)].

152 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
 | ConceivedThru(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
 -ConceivedThruItself(x) | -AttributeOf(v5,x) |
 ExpressesEternalEssentiality(v5). [resolve(97,e,93,c)].

153 -ConstInInfAttributes(x) | AttributeOf(y,x) | -Mode(z)
 | ConceivedThru(z,u) | -ConstInInfAttributes(x) | AttributeOf(w,x) |
 -ConceivedThruItself(x) | -AttributeOf(v5,x) |
 ExpressesInfiniteEssentiality(v5). [resolve(97,e,94,c)].

154 -ConstInInfAttributes(x) |
 -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
 -Mode(z) | ExistsIn(z,u) | -ConstInInfAttributes(x) |
 -ExpressesEternalEssentiality(w) | -ExpressesInfiniteEssentiality(w) |

-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesEternalEssentiality(v5). [resolve(101,f,98,d)].

155 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ExistsIn(z,u) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(w) | -ExpressesInfiniteEssentiality(w) |
-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesInfiniteEssentiality(v5). [resolve(101,f,99,d)].

156 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(w) | -ExpressesInfiniteEssentiality(w) |
-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesEternalEssentiality(v5). [resolve(102,f,98,d)].

157 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(w) | -ExpressesInfiniteEssentiality(w) |
-ConceivedThruItself(x) | -AttributeOf(v5,x) |
ExpressesInfiniteEssentiality(v5). [resolve(102,f,99,d)].

158 -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-ConstInInfAttributes(c1) | AttributeOf(y,c1) |
-ConceivedThruItself(c1) | -AttributeOf(z,c1) |
ExpressesEternalEssentiality(z). [resolve(103,c,93,c)].

159 -ConstInInfAttributes(c1) | AttributeOf(x,c1) |
-ConstInInfAttributes(c1) | AttributeOf(y,c1) |
-ConceivedThruItself(c1) | -AttributeOf(z,c1) |
ExpressesInfiniteEssentiality(z). [resolve(103,c,94,c)].

160 -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x) |
-ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -ConceivedThruItself(c1) |
-AttributeOf(z,c1) | ExpressesEternalEssentiality(z).
[resolve(104,d,98,d)].

161 -ConstInInfAttributes(c1) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x) |
-ConstInInfAttributes(c1) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -ConceivedThruItself(c1) |
-AttributeOf(z,c1) | ExpressesInfiniteEssentiality(z).
[resolve(104,d,99,d)].

kept: 162 -HasEssence(x) | Exists(x) | -Mode(y) | ExistsIn(y,z).
[resolve(106,a,88,c)].

kept: 163 -HasEssence(x) | Exists(x) | -Mode(y) |
ConceivedThru(y,z). [resolve(106,a,90,c)].

164 -HasEssence(c1) | Exists(c1). [resolve(106,a,92,a)].

===== PROOF =====

% Proof 1 at 0.08 (+ 0.01) seconds.

% Length of proof is 22.

% Level of proof is 5.

% Maximum clause weight is 2.000.

% Given clauses 0.

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

22 Substance(x) -> Exists(x) # label("SE: if x is substance, x
exists") # label(non_clause) # label(goal). [goal].

24 -SelfCaused(x) | EssenceInvExistence(x) # label("Definition I:
self-caused"). [clausify(1)].

26 -InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused"). [clausify(19)].


```

31 -Substance(x) | InItself(x) # label("Definition III: substance").
[clausify(3)].

39 -Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being"). [clausify(18)].

40 Substance(c1) # label("SE: if x is substance, x exists").
[deny(22)].

76 -Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence"). [clausify(20)].

79 Being(c1). [resolve(40,a,39,a)].

86 -InItself(x) | EssenceInvExistence(x). [resolve(26,b,24,a)].

87 -EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists"). [clausify(21)].

92 InItself(c1). [resolve(40,a,31,a)].

106 -InItself(x) | -HasEssence(x) | Exists(x). [resolve(86,b,87,a)].

118 -Exists(c1) # label("SE: if x is substance, x exists").
[deny(22)].

149 HasEssence(c1). [resolve(79,a,76,a)].

164 -HasEssence(c1) | Exists(c1). [resolve(106,a,92,a)].

165 $F. [copy(164),unit_del(a,149),unit_del(b,118)].

===== end of proof =====
===== STATISTICS =====

Given=0. Generated=68. Kept=43. proofs=1.

Usable=0. Sos=0. Demods=0. Limbo=43. Disabled=165. Hints=0.

Kept_by_rule=0, Deleted_by_rule=0.

Forward_subsumed=24. Back_subsumed=0.

Sos_limit_deleted=0. Sos_displaced=0. Sos_removed=0.

New_demodulators=0 (0 lex), Back_demodulated=0. Back_unit_deleted=0.

Demod_attempts=0. Demod_rewrites=0.

Res_instance_prunes=0. Para_instance_prunes=0. Basic_paramod_prunes=0.

```

Nonunit_fsub_feature_tests=23. Nonunit_bsub_feature_tests=0.

Megabytes=0.15.

User_CPU=0.08, System_CPU=0.01, Wall_clock=0.

==== end of statistics =====

==== end of search =====

THEOREM PROVED

Exiting with 1 proof.

Process 3824 exit (max_proofs) Sat Mar 9 11:28:27 2019

APPENDIX 8. Summary of *prover9* derivation of (GE) from the script obtained by augmenting BLOCK A in Figure 1 with Auxiliary Assumptions 4, 7, and 8.

```
===== Prover9 =====
Prover9 (32) version 2009-11A, November 2009.
Process 1752 was started by #AUTHOR on DESKTOP-AM4IKPU,
Tue May 7 08:51:53 2019
The command was "../bin/prover9".
===== end of head =====
===== INPUT =====
formulas(assumptions).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```

```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

God(a).

end_of_list.

formulas(goals).

Exists(a) # label("Prop. XI: God exists").

```

end_of_list.

==== end of input =====

==== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

```

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

19 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

20 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

21 Exists(a) # label("Prop. XI: God exists") # label(non_clause) #
label(goal). [goal].

===== end of process non-clausal formulas ===
===== PROCESS INITIAL CLAUSES =====

% Clauses before input processing:

formulas(usable).

end_of_list.

formulas(sos).

```

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-caused"). [clausify(1)].

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I: self-caused"). [clausify(1)].

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
[clausify(1)].

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind"). [clausify(2)].

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind"). [clausify(2)].

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind"). [clausify(2)].

-Substance(x) | InItself(x) # label("Definition III: substance").
[clausify(3)].

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance"). [clausify(3)].

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance"). [clausify(3)].

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute"). [clausify(4)].

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute"). [clausify(4)].

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode"). [clausify(5)].

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode"). [clausify(5)].

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").
[clausify(5)].

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode"). [clausify(5)].

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode"). [clausify(5)].

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode"). [clausify(5)].

-God(x) | Being(x) # label("Definition VI: God"). [clausify(6)].

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God"). [clausify(6)].

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God"). [clausify(6)].

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite"). [clausify(7)].

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite"). [clausify(7)].

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite"). [clausify(7)].

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite"). [clausify(7)].

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite"). [clausify(7)].

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite"). [clausify(7)].

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free"). [clausify(8)].

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free"). [clausify(8)].

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free"). [clausify(8)].

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free"). [clausify(8)].

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary"). [clausify(9)].

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary"). [clausify(9)].

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary"). [clausify(9)].

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary"). [clausify(9)].

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary"). [clausify(9)].

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary"). [clausify(9)].

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity"). [clausify(10)].

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity"). [clausify(10)].

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I"). [clausify(11)].

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I"). [clausify(11)].

Exists(x) | -ExistsIn(x,x) # label("Axiom I"). [clausify(11)].

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I"). [clausify(11)].

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II"). [clausify(12)].

ConceivedThru(x,x) | y != x # label("Axiom II"). [clausify(12)].

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III"). [clausify(13)].

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

```

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other."). [clausify(15)].

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other."). [clausify(15)].

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other."). [clausify(15)].

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other."). [clausify(15)].

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").
[clausify(16)].

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").
[clausify(16)].

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII"). [clausify(17)].

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused"). [clausify(18)].

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence"). [clausify(19)].

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists"). [clausify(20)].

God(a). [assumption].

-Exists(a) # label("Prop. XI: God exists"). [deny(21)].

end_of_list.

formulas(demodulators).

end_of_list.

===== PREDICATE ELIMINATION =====

Eliminating SelfCaused/1

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22 SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
[clausify(1)].

23 -SelfCaused(x) | EssenceInvExistence(x) # label("Definition I:
self-caused"). [clausify(1)].

24 -SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition
I: self-caused"). [clausify(1)].

25 -InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused"). [clausify(18)].

Derived: -InItself(x) | EssenceInvExistence(x). [resolve(25,b,23,a)].

Derived: -InItself(x) | NatureConcOnlyByExistence(x).
[resolve(25,b,24,a)].

Eliminating FiniteAfterItsKind/1

26 FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind"). [clausify(2)].

27 -FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition
II: finite after its kind"). [clausify(2)].

28 -FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II:
finite after its kind"). [clausify(2)].

Derived: -CanBeLimitedBy(x,y) | -SameKind(x,y) | CanBeLimitedBy(x,z).
[resolve(26,a,27,a)].

Derived: -CanBeLimitedBy(x,y) | -SameKind(x,y) | SameKind(x,z).
[resolve(26,a,28,a)].

Eliminating Substance/1

29 Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance"). [clausify(3)].

30 -Substance(x) | InItself(x) # label("Definition III: substance").
[clausify(3)].

31 -Substance(x) | ConceivedThruItself(x) # label("Definition III:
substance"). [clausify(3)].

32 -Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V:
mode"). [clausify(5)].

Derived: $\neg \text{Mode}(x) \mid \text{ExistsIn}(x,y) \mid \text{InItself}(z)$.
[resolve(32,b,30,a)].

Derived: $\neg \text{Mode}(x) \mid \text{ExistsIn}(x,y) \mid \text{ConceivedThruItself}(z)$.
[resolve(32,b,31,a)].

33 $\neg \text{Mode}(x) \mid \text{Substance}(y) \mid \text{ConceivedThru}(x,z)$ # label("Definition V:
mode"). [clausify(5)].

Derived: $\neg \text{Mode}(x) \mid \text{ConceivedThru}(x,y) \mid \text{InItself}(z)$.
[resolve(33,b,30,a)].

Derived: $\neg \text{Mode}(x) \mid \text{ConceivedThru}(x,y) \mid \text{ConceivedThruItself}(z)$.
[resolve(33,b,31,a)].

34 $\text{Mode}(x) \mid \neg \text{Modification}(x,y) \mid \neg \text{Substance}(y)$ # label("Definition V:
mode"). [clausify(5)].

Derived: $\text{Mode}(x) \mid \neg \text{Modification}(x,y) \mid \neg \text{InItself}(y) \mid$
 $\neg \text{ConceivedThruItself}(y)$. [resolve(34,c,29,a)].

Derived: $\text{Mode}(x) \mid \neg \text{Modification}(x,y) \mid \neg \text{Mode}(z) \mid \text{ExistsIn}(z,u)$.
[resolve(34,c,32,b)].

Derived: $\text{Mode}(x) \mid \neg \text{Modification}(x,y) \mid \neg \text{Mode}(z) \mid \text{ConceivedThru}(z,u)$.
[resolve(34,c,33,b)].

35 $\neg \text{AbsolutelyInfinite}(x) \mid \text{Substance}(x)$ # label("Definition VI:
absolutely infinite"). [clausify(7)].

Derived: $\neg \text{AbsolutelyInfinite}(x) \mid \text{InItself}(x)$. [resolve(35,b,30,a)].

Derived: $\neg \text{AbsolutelyInfinite}(x) \mid \text{ConceivedThruItself}(x)$.
[resolve(35,b,31,a)].

Derived: $\neg \text{AbsolutelyInfinite}(x) \mid \text{Mode}(y) \mid \neg \text{Modification}(y,x)$.
[resolve(35,b,34,c)].

36 $\text{AbsolutelyInfinite}(x) \mid \neg \text{Substance}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\text{AttributeOf}(y,x)$ # label("Definition VI: absolutely infinite").
[clausify(7)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\text{AttributeOf}(y,x) \mid \neg \text{InItself}(x) \mid \neg \text{ConceivedThruItself}(x)$.
[resolve(36,b,29,a)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid$
 $\text{AttributeOf}(y,x) \mid \neg \text{Mode}(z) \mid \text{ExistsIn}(z,u)$. [resolve(36,b,32,b)].

Derived: AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
AttributeOf(y,x) | -Mode(z) | ConceivedThru(z,u).
[resolve(36,b,33,b)].

37 AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) #
label("Definition VI: absolutely infinite"). [clausify(7)].

Derived: AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-InItself(x) | -ConceivedThruItself(x). [resolve(37,b,29,a)].

Derived: AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ExistsIn(z,u). [resolve(37,b,32,b)].

Derived: AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u). [resolve(37,b,33,b)].

Eliminating Attribute/1

38 Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV:
attribute"). [clausify(4)].

39 -Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV:
attribute"). [clausify(4)].

Eliminating Modification/2

40 Mode(x) | -Modification(x,y) | -InItself(y) |
-ConceivedThruItself(y). [resolve(34,c,29,a)].

41 -Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V:
mode"). [clausify(5)].

42 -Mode(x) | Modification(x,y) | ConceivedThru(x,z) #
label("Definition V: mode"). [clausify(5)].

43 Mode(x) | -Modification(x,y) | -Mode(z) | ExistsIn(z,u).
[resolve(34,c,32,b)].

44 Mode(x) | -Modification(x,y) | -Mode(z) | ConceivedThru(z,u).
[resolve(34,c,33,b)].

45 -AbsolutelyInfinite(x) | Mode(y) | -Modification(y,x).
[resolve(35,b,34,c)].

Eliminating Mode/1

46 $\neg \text{Mode}(x) \mid \text{ExistsIn}(x,y) \mid \text{InItself}(z)$. [resolve(32,b,30,a)].

47 $\text{Mode}(x) \mid \neg \text{ExistsIn}(x,y) \mid \neg \text{ConceivedThru}(x,y)$ # label("Definition V: mode"). [clausify(5)].

Derived: $\text{ExistsIn}(x,y) \mid \text{InItself}(z) \mid \neg \text{ExistsIn}(x,u) \mid \neg \text{ConceivedThru}(x,u)$. [resolve(46,a,47,a)].

48 $\neg \text{Mode}(x) \mid \text{ExistsIn}(x,y) \mid \text{ConceivedThruItself}(z)$. [resolve(32,b,31,a)].

Derived: $\text{ExistsIn}(x,y) \mid \text{ConceivedThruItself}(z) \mid \neg \text{ExistsIn}(x,u) \mid \neg \text{ConceivedThru}(x,u)$. [resolve(48,a,47,a)].

49 $\neg \text{Mode}(x) \mid \text{ConceivedThru}(x,y) \mid \text{InItself}(z)$. [resolve(33,b,30,a)].

Derived: $\text{ConceivedThru}(x,y) \mid \text{InItself}(z) \mid \neg \text{ExistsIn}(x,u) \mid \neg \text{ConceivedThru}(x,u)$. [resolve(49,a,47,a)].

50 $\neg \text{Mode}(x) \mid \text{ConceivedThru}(x,y) \mid \text{ConceivedThruItself}(z)$. [resolve(33,b,31,a)].

Derived: $\text{ConceivedThru}(x,y) \mid \text{ConceivedThruItself}(z) \mid \neg \text{ExistsIn}(x,u) \mid \neg \text{ConceivedThru}(x,u)$. [resolve(50,a,47,a)].

51 $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid \text{AttributeOf}(y,x) \mid \neg \text{Mode}(z) \mid \text{ExistsIn}(z,u)$. [resolve(36,b,32,b)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid \text{AttributeOf}(y,x) \mid \text{ExistsIn}(z,u) \mid \neg \text{ExistsIn}(z,w) \mid \neg \text{ConceivedThru}(z,w)$. [resolve(51,d,47,a)].

52 $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid \text{AttributeOf}(y,x) \mid \neg \text{Mode}(z) \mid \text{ConceivedThru}(z,u)$. [resolve(36,b,33,b)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid \text{AttributeOf}(y,x) \mid \text{ConceivedThru}(z,u) \mid \neg \text{ExistsIn}(z,w) \mid \neg \text{ConceivedThru}(z,w)$. [resolve(52,d,47,a)].

53 $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid \neg \text{ExpressesEternalEssentiality}(y) \mid \neg \text{ExpressesInfiniteEssentiality}(y) \mid \neg \text{Mode}(z) \mid \text{ExistsIn}(z,u)$. [resolve(37,b,32,b)].

Derived: $\text{AbsolutelyInfinite}(x) \mid \neg \text{ConstInInfAttributes}(x) \mid \neg \text{ExpressesEternalEssentiality}(y) \mid \neg \text{ExpressesInfiniteEssentiality}(y) \mid \text{ExistsIn}(z,u) \mid \neg \text{ExistsIn}(z,w) \mid \neg \text{ConceivedThru}(z,w)$. [resolve(53,e,47,a)].

54 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-Mode(z) | ConceivedThru(z,u). [resolve(37,b,33,b)].

Derived: AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w).
[resolve(54,e,47,a)].

Eliminating God/1

55 God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI:
God"). [clausify(6)].

56 -God(x) | Being(x) # label("Definition VI: God"). [clausify(6)].

57 -God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").
[clausify(6)].

58 God(a). [assumption].

Derived: Being(a). [resolve(58,a,56,a)].

Derived: AbsolutelyInfinite(a). [resolve(58,a,57,a)].

Eliminating AbsolutelyInfinite/1

59 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) | AttributeOf(y,x)
| -InItself(x) | -ConceivedThruItself(x). [resolve(36,b,29,a)].

60 -AbsolutelyInfinite(x) | ConstInInfAttributes(x) #
label("Definition VI: absolutely infinite"). [clausify(7)].

61 -AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesEternalEssentiality(y) # label("Definition VI: absolutely
infinite"). [clausify(7)].

62 -AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite"). [clausify(7)].

63 -AbsolutelyInfinite(x) | InItself(x). [resolve(35,b,30,a)].

64 -AbsolutelyInfinite(x) | ConceivedThruItself(x).
[resolve(35,b,31,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(59,a,61,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(59,a,62,a)].

65 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
-InItself(x) | -ConceivedThruItself(x). [resolve(37,b,29,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(65,a,61,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(65,a,62,a)].

66 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) | AttributeOf(y,x)
| ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w).
[resolve(51,d,47,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | ExistsIn(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | -AttributeOf(v5,x) |
ExpressesEternalEssentiality(v5). [resolve(66,a,61,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | ExistsIn(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | -AttributeOf(v5,x) |
ExpressesInfiniteEssentiality(v5). [resolve(66,a,62,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | ExistsIn(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | InItself(x).
[resolve(66,a,63,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | ExistsIn(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | ConceivedThruItself(x).
[resolve(66,a,64,a)].

67 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) | AttributeOf(y,x)
| ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w).
[resolve(52,d,47,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesEternalEssentiality(v5).
[resolve(67,a,61,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesInfiniteEssentiality(v5).
[resolve(67,a,62,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
InItself(x). [resolve(67,a,63,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
ConceivedThruItself(x). [resolve(67,a,64,a)].

68 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w).
[resolve(53,e,47,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ExistsIn(z,u) | -ExistsIn(z,w) |
-ConceivedThru(z,w) | -AttributeOf(v5,x) |
ExpressesEternalEssentiality(v5). [resolve(68,a,61,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ExistsIn(z,u) | -ExistsIn(z,w) |
-ConceivedThru(z,w) | -AttributeOf(v5,x) |
ExpressesInfiniteEssentiality(v5). [resolve(68,a,62,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ExistsIn(z,u) | -ExistsIn(z,w) |
-ConceivedThru(z,w) | InItself(x). [resolve(68,a,63,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ExistsIn(z,u) | -ExistsIn(z,w) |
-ConceivedThru(z,w) | ConceivedThruItself(x). [resolve(68,a,64,a)].

69 AbsolutelyInfinite(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w).
[resolve(54,e,47,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ConceivedThru(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | -AttributeOf(v5,x) |
ExpressesEternalEssentiality(v5). [resolve(69,a,61,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ConceivedThru(z,u) |

-ExistsIn(z,w) | -ConceivedThru(z,w) | -AttributeOf(v5,x) |
ExpressesInfiniteEssentiality(v5). [resolve(69,a,62,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ConceivedThru(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | InItself(x).
[resolve(69,a,63,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ConceivedThru(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | ConceivedThruItself(x).
[resolve(69,a,64,a)].

70 AbsolutelyInfinite(a). [resolve(58,a,57,a)].

Derived: ConstInInfAttributes(a). [resolve(70,a,60,a)].

Derived: -AttributeOf(x,a) | ExpressesEternalEssentiality(x).
[resolve(70,a,61,a)].

Derived: -AttributeOf(x,a) | ExpressesInfiniteEssentiality(x).
[resolve(70,a,62,a)].

Derived: InItself(a). [resolve(70,a,63,a)].

Derived: ConceivedThruItself(a). [resolve(70,a,64,a)].

Eliminating Free/1

71 Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free"). [clausify(8)].

72 -Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free"). [clausify(8)].

73 -Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free"). [clausify(8)].

Derived: -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) |
-ActionOf(z,x) | DeterminedByItselfAlone(z,x). [resolve(71,a,73,a)].

74 Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").
[clausify(8)].

Derived: -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) | -ActionOf(z,x) |
DeterminedByItselfAlone(z,x). [resolve(74,a,73,a)].

Eliminating Necessary/1

75 Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary"). [clausify(9)].

76 -Necessary(x) | ExternalTo(y,x) # label("Definition VII:
necessary"). [clausify(9)].

77 -Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition
VII: necessary"). [clausify(9)].

78 -Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary"). [clausify(9)].

79 -Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary"). [clausify(9)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
ExternalTo(z,y). [resolve(75,a,76,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByFixedMethod(y,z). [resolve(75,a,77,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByDefiniteMethod(y,z). [resolve(75,a,78,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
IsMethodAction(z) | IsMethodExistence(z). [resolve(75,a,79,a)].

80 Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary"). [clausify(9)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
ExternalTo(z,y). [resolve(80,a,76,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
DeterminedByFixedMethod(y,z). [resolve(80,a,77,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
DeterminedByDefiniteMethod(y,z). [resolve(80,a,78,a)].

Derived: -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
IsMethodAction(z) | IsMethodExistence(z). [resolve(80,a,79,a)].

Eliminating Eternity/1

81 Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity"). [clausify(10)].

82 -Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity"). [clausify(10)].

Eliminating DefiniteCause/1

Eliminating KnowledgeOfEffect/2

83 KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

84 -KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause"). [clausify(14)].

Eliminating HaveNothingInCommon/2

Eliminating TrueIdea/1

Eliminating CanBeConceivedAsNonExisting/1

Eliminating Being/1

85 Being(a). [resolve(58,a,56,a)].

86 -Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence"). [clausify(19)].

Derived: HasEssence(a). [resolve(85,a,86,a)].

Eliminating EssenceInvExistence/1

87 -InItself(x) | EssenceInvExistence(x). [resolve(25,b,23,a)].

88 -EssenceInvExistence(x) | -HasEssence(x) | Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists"). [clausify(20)].

Derived: -InItself(x) | -HasEssence(x) | Exists(x).
[resolve(87,b,88,a)].

Eliminating InItself/1

89 ExistsIn(x,y) | InItself(z) | -ExistsIn(x,u) | -ConceivedThru(x,u).
[resolve(46,a,47,a)].

90 -InItself(x) | NatureConcOnlyByExistence(x). [resolve(25,b,24,a)].

Derived: ExistsIn(x,y) | -ExistsIn(x,z) | -ConceivedThru(x,z) |
NatureConcOnlyByExistence(u). [resolve(89,b,90,a)].

91 ConceivedThru(x,y) | InItself(z) | -ExistsIn(x,u) |
-ConceivedThru(x,u). [resolve(49,a,47,a)].

Derived: ConceivedThru(x,y) | -ExistsIn(x,z) | -ConceivedThru(x,z) |
NatureConcOnlyByExistence(u). [resolve(91,b,90,a)].

92 -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(59,a,61,a)].

93 -ConstInInfAttributes(x) | AttributeOf(y,x) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(59,a,62,a)].

94 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesEternalEssentiality(z). [resolve(65,a,61,a)].

95 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | -InItself(x) |
-ConceivedThruItself(x) | -AttributeOf(z,x) |
ExpressesInfiniteEssentiality(z). [resolve(65,a,62,a)].

96 -ConstInInfAttributes(x) | AttributeOf(y,x) | ExistsIn(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | InItself(x).
[resolve(66,a,63,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | ExistsIn(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | -ConstInInfAttributes(x) |
AttributeOf(v5,x) | -ConceivedThruItself(x) | -AttributeOf(v6,x) |
ExpressesEternalEssentiality(v6). [resolve(96,f,92,c)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) | ExistsIn(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | -ConstInInfAttributes(x) |
AttributeOf(v5,x) | -ConceivedThruItself(x) | -AttributeOf(v6,x) |
ExpressesInfiniteEssentiality(v6). [resolve(96,f,93,c)].

97 -ConstInInfAttributes(x) | AttributeOf(y,x) | ConceivedThru(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | InItself(x).
[resolve(67,a,63,a)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | AttributeOf(v5,x) | -ConceivedThruItself(x)
| -AttributeOf(v6,x) | ExpressesEternalEssentiality(v6).
[resolve(97,f,92,c)].

Derived: -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | AttributeOf(v5,x) | -ConceivedThruItself(x)
| -AttributeOf(v6,x) | ExpressesInfiniteEssentiality(v6).
[resolve(97,f,93,c)].

98 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ExistsIn(z,u) | -ExistsIn(z,w) |
-ConceivedThru(z,w) | InItself(x). [resolve(68,a,63,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ExistsIn(z,u) | -ExistsIn(z,w) |
-ConceivedThru(z,w) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(v5) | -ExpressesInfiniteEssentiality(v5)
| -ConceivedThruItself(x) | -AttributeOf(v6,x) |
ExpressesEternalEssentiality(v6). [resolve(98,g,94,d)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ExistsIn(z,u) | -ExistsIn(z,w) |
-ConceivedThru(z,w) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(v5) | -ExpressesInfiniteEssentiality(v5)
| -ConceivedThruItself(x) | -AttributeOf(v6,x) |
ExpressesInfiniteEssentiality(v6). [resolve(98,g,95,d)].

99 -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ConceivedThru(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | InItself(x).
[resolve(69,a,63,a)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ConceivedThru(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(v5) | -ExpressesInfiniteEssentiality(v5)
| -ConceivedThruItself(x) | -AttributeOf(v6,x) |
ExpressesEternalEssentiality(v6). [resolve(99,g,94,d)].

Derived: -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) |
-ExpressesInfiniteEssentiality(y) | ConceivedThru(z,u) |
-ExistsIn(z,w) | -ConceivedThru(z,w) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(v5) | -ExpressesInfiniteEssentiality(v5)

```

| -ConceivedThruItself(x) | -AttributeOf(v6,x) |
ExpressesInfiniteEssentiality(v6). [resolve(99,g,95,d)].

100 InItself(a). [resolve(70,a,63,a)].

Derived: NatureConcOnlyByExistence(a). [resolve(100,a,90,a)].

Derived: -ConstInInfAttributes(a) | AttributeOf(x,a) |
-ConceivedThruItself(a) | -AttributeOf(y,a) |
ExpressesEternalEssentiality(y). [resolve(100,a,92,c)].

Derived: -ConstInInfAttributes(a) | AttributeOf(x,a) |
-ConceivedThruItself(a) | -AttributeOf(y,a) |
ExpressesInfiniteEssentiality(y). [resolve(100,a,93,c)].

Derived: -ConstInInfAttributes(a) | -ExpressesEternalEssentiality(x) |
-ExpressesInfiniteEssentiality(x) | -ConceivedThruItself(a) |
-AttributeOf(y,a) | ExpressesEternalEssentiality(y).
[resolve(100,a,94,d)].

Derived: -ConstInInfAttributes(a) | -ExpressesEternalEssentiality(x) |
-ExpressesInfiniteEssentiality(x) | -ConceivedThruItself(a) |
-AttributeOf(y,a) | ExpressesInfiniteEssentiality(y).
[resolve(100,a,95,d)].

101 -InItself(x) | -HasEssence(x) | Exists(x). [resolve(87,b,88,a)].

Derived: -HasEssence(x) | Exists(x) | ExistsIn(y,z) | -ExistsIn(y,u) |
-ConceivedThru(y,u). [resolve(101,a,89,b)].

Derived: -HasEssence(x) | Exists(x) | ConceivedThru(y,z) |
-ExistsIn(y,u) | -ConceivedThru(y,u). [resolve(101,a,91,b)].

Derived: -HasEssence(a) | Exists(a). [resolve(101,a,100,a)].

Eliminating ExistsOnlyByNecessityOfOwnNature/1

Eliminating NatureConcOnlyByExistence/1

===== end predicate elimination =====

Auto_denials: (non-Horn, no changes).

Term ordering decisions:

Predicate symbol precedence: predicate_order([ =,
ConstInInfAttributes, ExpressesEternalEssentiality,
ExpressesInfiniteEssentiality, ConceivedThruItself, Exists,
IsMethodAction, IsMethodExistence, HasEssence, ExistsIn,

```

```

ConceivedThru, AttributeOf, DeterminedByDefiniteMethod,
DeterminedByFixedMethod, ExternalTo, CanBeLimitedBy, SameKind ]).

Function symbol precedence:  function_order([ a ]).

After inverse_order:  (no changes).

Unfolding symbols:  (none).

Auto_inference settings:

    % set(paramodulation).  % (positive equality literals)

    % set(binary_resolution).  % (non-Horn)

    % set(neg_ur_resolution).  % (non-Horn, less than 100 clauses)

Auto_process settings:

    % set(factor).  % (non-Horn)

    % set(unit_deletion).  % (non-Horn)

kept:      102 -Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) #
label("Axiom I").  [clausify(11)].

           103 -Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").
[clausify(11)].

kept:      104 -Exists(x) | ExistsIn(x,x).  [copy(103),xx(c)].

kept:      105 Exists(x) | -ExistsIn(x,x) # label("Axiom I").
[clausify(11)].

kept:      106 Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").
[clausify(11)].

kept:      107 ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom
II").  [clausify(12)].

           108 ConceivedThru(x,x) | y != x # label("Axiom II").
[clausify(12)].

kept:      109 ConceivedThru(x,x).  [copy(108),xx(b)].

kept:      110 -Exists(a) # label("Prop. XI: God exists").
[deny(21)].

kept:      111 -CanBeLimitedBy(x,y) | -SameKind(x,y) |
CanBeLimitedBy(x,z).  [resolve(26,a,27,a)].

```


kept: 112 -CanBeLimitedBy(x,y) | -SameKind(x,y) | SameKind(x,z).
[resolve(26,a,28,a)].

kept: 113 ExistsIn(x,y) | ConceivedThruItself(z) | -ExistsIn(x,u)
| -ConceivedThru(x,u). [resolve(48,a,47,a)].

kept: 114 ConceivedThru(x,y) | ConceivedThruItself(z) |
-ExistsIn(x,u) | -ConceivedThru(x,u). [resolve(50,a,47,a)].

kept: 115 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesEternalEssentiality(v5).
[resolve(66,a,61,a)].

kept: 116 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesInfiniteEssentiality(v5).
[resolve(66,a,62,a)].

kept: 117 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesEternalEssentiality(v5).
[resolve(67,a,61,a)].

kept: 118 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesInfiniteEssentiality(v5).
[resolve(67,a,62,a)].

kept: 119 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesEternalEssentiality(v5).
[resolve(68,a,61,a)].

kept: 120 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesInfiniteEssentiality(v5).
[resolve(68,a,62,a)].

kept: 121 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesEternalEssentiality(v5).
[resolve(69,a,61,a)].

kept: 122 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-AttributeOf(v5,x) | ExpressesInfiniteEssentiality(v5).
[resolve(69,a,62,a)].

kept: 123 ConstInInfAttributes(a). [resolve(70,a,60,a)].

kept: 124 -AttributeOf(x,a) | ExpressesEternalEssentiality(x).
[resolve(70,a,61,a)].

kept: 125 -AttributeOf(x,a) | ExpressesInfiniteEssentiality(x).
[resolve(70,a,62,a)].

kept: 126 ConceivedThruItself(a). [resolve(70,a,64,a)].

kept: 127 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
ExternalTo(z,y). [resolve(75,a,76,a)].

kept: 128 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByFixedMethod(y,z). [resolve(75,a,77,a)].

kept: 129 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
DeterminedByDefiniteMethod(y,z). [resolve(75,a,78,a)].

kept: 130 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodAction(x) |
IsMethodAction(z) | IsMethodExistence(z). [resolve(75,a,79,a)].

kept: 131 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
ExternalTo(z,y). [resolve(80,a,76,a)].

kept: 132 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
DeterminedByFixedMethod(y,z). [resolve(80,a,77,a)].

kept: 133 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
DeterminedByDefiniteMethod(y,z). [resolve(80,a,78,a)].

kept: 134 -ExternalTo(x,y) | -DeterminedByFixedMethod(y,x) |
-DeterminedByDefiniteMethod(y,x) | -IsMethodExistence(x) |
IsMethodAction(z) | IsMethodExistence(z). [resolve(80,a,79,a)].

kept: 135 HasEssence(a). [resolve(85,a,86,a)].

136 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | AttributeOf(v5,x) | -ConceivedThruItself(x)
| -AttributeOf(v6,x) | ExpressesEternalEssentiality(v6).
[resolve(96,f,92,c)].

137 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | AttributeOf(v5,x) | -ConceivedThruItself(x)
| -AttributeOf(v6,x) | ExpressesInfiniteEssentiality(v6).
[resolve(96,f,93,c)].

138 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | AttributeOf(v5,x) | -ConceivedThruItself(x)
| -AttributeOf(v6,x) | ExpressesEternalEssentiality(v6).
[resolve(97,f,92,c)].

139 -ConstInInfAttributes(x) | AttributeOf(y,x) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | AttributeOf(v5,x) | -ConceivedThruItself(x)
| -AttributeOf(v6,x) | ExpressesInfiniteEssentiality(v6).
[resolve(97,f,93,c)].

140 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(v5) |
-ExpressesInfiniteEssentiality(v5) | -ConceivedThruItself(x) |
-AttributeOf(v6,x) | ExpressesEternalEssentiality(v6).
[resolve(98,g,94,d)].

141 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ExistsIn(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(v5) |
-ExpressesInfiniteEssentiality(v5) | -ConceivedThruItself(x) |
-AttributeOf(v6,x) | ExpressesInfiniteEssentiality(v6).
[resolve(98,g,95,d)].

142 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(v5) |
-ExpressesInfiniteEssentiality(v5) | -ConceivedThruItself(x) |
-AttributeOf(v6,x) | ExpressesEternalEssentiality(v6).
[resolve(99,g,94,d)].

```
143 -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) |
ConceivedThru(z,u) | -ExistsIn(z,w) | -ConceivedThru(z,w) |
-ConstInInfAttributes(x) | -ExpressesEternalEssentiality(v5) |
-ExpressesInfiniteEssentiality(v5) | -ConceivedThruItself(x) |
-AttributeOf(v6,x) | ExpressesInfiniteEssentiality(v6).
[resolve(99,g,95,d)].
```

```
144 -ConstInInfAttributes(a) | AttributeOf(x,a) |
-ConceivedThruItself(a) | -AttributeOf(y,a) |
ExpressesEternalEssentiality(y). [resolve(100,a,92,c)].
```

```
145 -ConstInInfAttributes(a) | AttributeOf(x,a) |
-ConceivedThruItself(a) | -AttributeOf(y,a) |
ExpressesInfiniteEssentiality(y). [resolve(100,a,93,c)].
```

```
146 -ConstInInfAttributes(a) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x) |
-ConceivedThruItself(a) | -AttributeOf(y,a) |
ExpressesEternalEssentiality(y). [resolve(100,a,94,d)].
```

```
147 -ConstInInfAttributes(a) |
-ExpressesEternalEssentiality(x) | -ExpressesInfiniteEssentiality(x) |
-ConceivedThruItself(a) | -AttributeOf(y,a) |
ExpressesInfiniteEssentiality(y). [resolve(100,a,95,d)].
```

```
kept: 148 -HasEssence(x) | Exists(x) | ExistsIn(y,z) |
-ExistsIn(y,u) | -ConceivedThru(y,u). [resolve(101,a,89,b)].
```

```
kept: 149 -HasEssence(x) | Exists(x) | ConceivedThru(y,z) |
-ExistsIn(y,u) | -ConceivedThru(y,u). [resolve(101,a,91,b)].
```

```
150 -HasEssence(a) | Exists(a). [resolve(101,a,100,a)].
```

```
===== PROOF =====
```

```
% Proof 1 at 0.03 (+ 0.05) seconds.
```

```
% Length of proof is 27.
```

```
% Level of proof is 5.
```

```
% Maximum clause weight is 2.000.
```

```
% Given clauses 0.
```

```
1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].
```

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

18 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

19 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

20 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

21 Exists(a) # label("Prop. XI: God exists") # label(non_clause) #
label(goal). [goal].

23 -SelfCaused(x) | EssenceInvExistence(x) # label("Definition I:
self-caused"). [clausify(1)].

25 -InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused"). [clausify(18)].

30 -Substance(x) | InItself(x) # label("Definition III: substance").
[clausify(3)].

35 -AbsolutelyInfinite(x) | Substance(x) # label("Definition VI:
absolutely infinite"). [clausify(7)].

56 -God(x) | Being(x) # label("Definition VI: God"). [clausify(6)].

57 -God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").
[clausify(6)].

58 God(a). [assumption].

63 -AbsolutelyInfinite(x) | InItself(x). [resolve(35,b,30,a)].

70 AbsolutelyInfinite(a). [resolve(58,a,57,a)].

85 Being(a). [resolve(58,a,56,a)].

86 -Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence"). [clausify(19)].

87 -InItself(x) | EssenceInvExistence(x). [resolve(25,b,23,a)].

88 -EssenceInvExistence(x) | -HasEssence(x) | Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists"). [clausify(20)].

100 InItself(a). [resolve(70,a,63,a)].

101 -InItself(x) | -HasEssence(x) | Exists(x). [resolve(87,b,88,a)].

110 -Exists(a) # label("Prop. XI: God exists"). [deny(21)].

135 HasEssence(a). [resolve(85,a,86,a)].

150 -HasEssence(a) | Exists(a). [resolve(101,a,100,a)].

151 \$F. [copy(150),unit_del(a,135),unit_del(b,110)].

==== end of proof =====

==== STATISTICS =====

Given=0. Generated=51. Kept=34. proofs=1.

Usable=0. Sos=0. Demods=0. Limbo=34, Disabled=144. Hints=0.

Kept_by_rule=0, Deleted_by_rule=0.

Forward_subsumed=16. Back_subsumed=0.

Sos_limit_deleted=0. Sos_displaced=0. Sos_removed=0.

New_demodulators=0 (0 lex), Back_demodulated=0. Back_unit_deleted=0.

Demod_attempts=0. Demod_rewrites=0.

Res_instance_prunes=0. Para_instance_prunes=0. Basic_paramod_prunes=0.

Nonunit_fsub_feature_tests=19. Nonunit_bsub_feature_tests=0.

Megabytes=0.12.

User_CPU=0.03, System_CPU=0.05, Wall_clock=0.

==== end of statistics =====

==== end of search =====

THEOREM PROVED

Exiting with 1 proof.

Process 1752 exit (max_proofs) Tue May 7 08:51:53 2019

APPENDIX 9. A *mace4* model that shows (SE) is independent of the DAPI conjoined with Auxiliary Assumptions 4,7, and 8 (i.e., independent of the assumptions used to derive (GE)).

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 12408 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 14:51:36 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====

set(print_models_tabular).

% set(print_models_tabular) -> clear(print_models).

formulas(theory).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
```



```

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

-(Substance(x) -> Exists(x)) # label("Deny SE").

end_of_list.

```

==== end of input =====

==== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

19 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

20 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

21 -(Substance(x) -> Exists(x)) # label("Deny SE") #
label(non_clause). [assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

Substance(x) # label("Deny SE").

-Exists(x) # label("Deny SE").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0
Attribute :
    0 1
    -----
    0 0
Being :
    0 1
    -----
    0 0
CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

1 1
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

1 1
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

1 1

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

1 1

Necessary :

0 1

0 0

SelfCaused :

0 1

1 1

Substance :

0 1

1 1

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=206, kept=197.

Selections=90, assignments=90, propagations=44, current_models=1.

Rewrite_terms=0, rewrite_bools=278, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 12408 exit (max_models) Sat Mar 9 14:51:36 2019

The process finished Sat Mar 9 14:51:36 2019

APPENDIX 10. Expansions of the predicate/relation/function-abbreviations appearing in the *mace4* and *prover9* scripts in this paper.

Predicate/Relation/Function	Expansion
AbsolutelyInfinite(x)	x is absolutely infinite
ActionOf(y,x)	y is an action of x
Attribute(x)	x is an attribute
AttributeOf(y,x)	y is an attribute of x
Being(x)	x is/has being
CanBeConceivedAsNonExisting(x)	x can be conceived of as non-existing
ConceivedThruItself(x)	x can be conceived through itself
CanBeLimitedBy(x,y)	x can be limited by y
CanBeUnderstoodInTermsOf(x,y)	x can be understood in terms of y
ConceivedThru(x,y)	x is conceived through y
ConceptionInvolves(x,y)	the conception of x involves the conception of y
ConstInInfAttributes(x)	x consists in infinite attributes
CorrespondsWith(x,y)	x corresponds with y
DefiniteCause(x)	x is a definite cause
DeterminedBy(x,y)	x is determined by y
DeterminedByDefiniteMethod(x,y)	x is determined by definite method y
DeterminedByFixedMethod(x,y)	x is determined by fixed method y
DeterminedByItselfAlone(y,x)	y is determined by x alone
EffectNecessarilyFollowsFrom(y,x)	effect y necessarily follows from x
EssenceInvExistence(x)	the essence of x involves existence
Eternity(x)	x is eternity
Exists(x)	x exists
ExistConcFollowFromDefEternal(x)	x is existence as it is conceived to follow from the definition of eternal
ExistsIn(x,y)	x exists in y
ExistsOnlyByNecessityOfOwnNature(x)	x exists only by necessity of its own nature
ExpressesEternalEssentiality(y)	y expresses eternal essentiality
ExpressesInfiniteEssentiality(y)	y expresses infinite essentiality
ExternalTo(y,x)	y is external to x
FiniteAfterItsKind(x)	x is finite after its kind
Free(x)	x is free
God(x)	x is God
HasEssence(x)	x has essence
HaveNothingInCommon(x,y)	x has nothing in common with y
IdeateOf(y,x)	y is the ideate of x
InItself(x)	x is in itself
IntPercAsConstEssSub(x)	x is that which the intellect perceives as constituting the essence of substance
Involves(x,y)	x involves y
IsACause(x,y)	x is a cause of y
IsAnEffect(x)	x is an effect
IsMethodAction(y)	y is a method of action
IsMethodExistence(y)	y is a method of existence
KnowledgeOfACause(x)	x is knowledge of a cause
KnowledgeOfEffect(x,y)	x is knowledge of y
Mode(x)	x is a mode
Modification(x,y)	x is a modification of y
NatureConcOnlyByExistence(x)	the nature of x is conceivable only by the existence of x
Necessary(x)	x is necessary
ObjectOf(y,x)	y is the object of x
SameKind(x,y)	x and y are of the same kind

SelfCaused(x)	x is self-caused
Substance(x)	x is/has substance
TrueIdea(x)	x is a true idea

Appendix 11. *mace4* model showing consistency of the DAPI.

```

===== Mace4 =====

Mace4 (32) version 2009-11A, November 2009.

Process 13008 was started by #AUTHOR on DESKTOP-AM4IKPU,

Sat Mar 9 11:10:21 2019

The command was "../bin/mace4".

===== end of head =====
===== INPUT =====

assign(iterate_up_to,10).

    % assign(iterate_up_to, 10) -> assign(end_size, 10).

set(print_models_tabular).

    % set(print_models_tabular) -> clear(print_models).

formulas(theory).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &

```

ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

end_of_list.

==== end of input =====

==== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) # label("Definition I: self-caused") # label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

```

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite
after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III:
substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

```

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

```

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

```

```

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

end_of_list.

```

```

===== end of clauses for search =====

```

```

% There are no natural numbers in the input.

```

```

===== DOMAIN SIZE 2 =====

```

```

AbsolutelyInfinite :

```

```

    0 1

```

```

    -----

```

```

    0 0

```

```

Attribute :

```

```

    0 1

```

```

    -----

```

```

    0 0

```

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :
0 1

```
-----  
    0 0  
God :  
    0 1  
-----  
    0 0  
InItself :  
    0 1  
-----  
    0 0  
IntPercAsConstEssSub :  
    0 1  
-----  
    0 0  
IsMethodAction :  
    0 1  
-----  
    0 0  
IsMethodExistence :  
    0 1  
-----  
    0 0  
KnowledgeOfACause :  
    0 1  
-----  
    0 0  
Mode :
```

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

=====
===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=196, kept=187.

Selections=106, assignments=106, propagations=26, current_models=1.

Rewrite_terms=0, rewrite_bools=250, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

=====
===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 13008 exit (max_models) Sat Mar 9 11:10:21 2019

The process finished Sat Mar 9 11:10:21 2019

APPENDIX 12. *mace4* output showing independence of Axiom 1 from DAPI conjoined with Auxiliary Assumptions 1, 4, 7, and 8.

=====
===== Mace4 =====

Mace4 (32) version 2009-11A, November 2009.

Process 9092 was started by #AUTHOR on DESKTOP-AM4IKPU,

Sat Mar 9 11:00:25 2019

The command was "../bin/mace4".

==== end of head =====

==== INPUT =====

```
set(print_models_tabular).
```

```
    % set(print_models_tabular) -> clear(print_models).
```

```
formulas(theory).
```

```
SelfCaused(x) <-> EssenceInvExistence(x) &  
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
```

```
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #  
label("Definition II: finite after its kind").
```

```
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #  
label("Definition III: substance").
```

```
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:  
attribute").
```

```
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &  
ConceivedThru(x,z) # label("Definition V: mode").
```

```
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:  
God").
```

```
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &  
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &  
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely  
infinite").
```

```
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->  
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```

```
Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &  
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |  
IsMethodExistence(y)) # label("Definition VII: necessary").
```

```
Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition  
VIII: eternity").
```



```

-(Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y) # label("Deny
Axiom I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====
===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

```

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 -(Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y) #
label("Deny Axiom I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

```

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====

===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite
after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

```

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) #
label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Deny Axiom I").

Exists(x) | ExistsIn(x,x) | y != x # label("Deny Axiom I").

-Exists(x) | -ExistsIn(x,x) # label("Deny Axiom I").

-Exists(x) | -ExistsIn(x,y) | y = x # label("Deny Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

```
-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has  
being, then x has essence").
```

```
-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #  
label("Auxiliary assumption 8: if the essence of x involves the  
existence of x and x has essence, then x exists").
```

```
end_of_list.
```

```
===== end of clauses for search =====
```

```
% There are no natural numbers in the input.
```

```
===== DOMAIN SIZE 2 =====
```

```
AbsolutelyInfinite :
```

```
0 1
```

```
-----
```

```
0 0
```

```
Attribute :
```

```
0 1
```

```
-----
```

```
0 0
```

```
Being :
```

```
0 1
```

```
-----
```

```
0 0
```

```
CanBeConceivedAsNonExisting :
```

```
0 1
```

```
-----
```

```
0 0
```

```
ConceivedThruItself :
```

```
0 1
```

```
-----
```

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0

ExistConcFollowFromDefEternal :

0 1

0 0

Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :
0 1

0 0
God :
0 1

0 0
HasEssence :
0 1

0 0
InItself :

```
    0 1
-----
    0 0
IntPercAsConstEssSub :
    0 1
-----
    0 0
IsMethodAction :
    0 1
-----
    0 0
IsMethodExistence :
    0 1
-----
    0 0
KnowledgeOfACause :
    0 1
-----
    0 0
Mode :
    0 1
-----
    1 1
NatureConcOnlyByExistence :
    0 1
-----
    0 0
```

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 1

1 | 1 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 1 1

1 | 1 1

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.03 seconds).

Ground clauses: seen=204, kept=195.

Selections=104, assignments=104, propagations=30, current_models=1.

Rewrite_terms=0, rewrite_bools=271, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.03, System_CPU=0.01, Wall_clock=0.

Exiting with 1 model.

Process 9092 exit (max_models) Sat Mar 9 11:00:25 2019

The process finished Sat Mar 9 11:00:25 2019

APPENDIX 13. *mace4* output showing independence of Axiom 2 from DAPI conjoined with Auxiliary Assumptions 1, 4, 7, and 8.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 10680 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar  9 11:02:14 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).

% set(print_models_tabular) -> clear(print_models).

formulas(theory).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
```


ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom I").

-(-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y) # label("Deny Axiom II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) & -CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) & -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) # label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

==== end of input =====

==== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) & NatureConcOnlyByExistence(x) # label("Definition I: self-caused") # label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) # label("Definition II: finite after its kind") # label(non_clause). [assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) # label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV: attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) & ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause). [assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI: God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) & (AttributeOf(y,x) -> ExpressesEternalEssentiality(y) & ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) -> DeterminedByItselfAlone(y,x)) # label("Definition VII: free") # label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) & DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) | IsMethodExistence(y)) # label("Definition VII: necessary") # label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity") # label(non_clause). [assumption].

```

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -(-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y) # label("Deny
Axiom II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

```

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
 label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
 -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
 label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition
 VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

-ConceivedThru(x,x) # label("Deny Axiom II").

-ConceivedThru(x,y) | y = x # label("Deny Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
 III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
 knowledge of an effect depends on and involves the knowledge of a
 cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
 label("Axiom V: Things which have nothing in common cannot be
 understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
 Things which have nothing in common cannot be understood, the one by
 means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

0 0
CanBeConceivedAsNonExisting :
0 1

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :

0 1

0 0
Exists :
0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :
0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=202, kept=196.

Selections=104, assignments=104, propagations=30, current_models=1.

Rewrite_terms=0, rewrite_bools=267, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 10680 exit (max_models) Sat Mar 9 11:02:14 2019

The process finished Sat Mar 9 11:02:14 2019

APPENDIX 14. *mace4* output showing independence of Axiom 3 from DAPI conjoined with Auxiliary Assumptions 1, 4, 7, and 8.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 12668 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar  9 11:04:06 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```



```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

-(DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x))) # label("Deny
Axiom III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other. ").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 $\neg(\text{DefiniteCause}(x) \rightarrow \text{EffectNecessarilyFollowsFrom}(y,x) \ \& \ (\neg \text{DefiniteCause}(x) \rightarrow \neg \text{EffectNecessarilyFollowsFrom}(y,x)))$ # label("Deny Axiom III") # label(non_clause). [assumption].

14 $\text{KnowledgeOfEffect}(x,y) \leftrightarrow \text{KnowledgeOfACause}(x)$ # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause") # label(non_clause). [assumption].

15 $\text{HaveNothingInCommon}(x,y) \rightarrow \neg \text{CanBeUnderstoodInTermsOf}(x,y) \ \& \ \neg \text{CanBeUnderstoodInTermsOf}(y,x) \ \& \ \neg \text{ConceptionInvolves}(x,y) \ \& \ \neg \text{ConceptionInvolves}(y,x)$ # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.") # label(non_clause). [assumption].

16 $\text{TrueIdea}(x) \rightarrow \text{CorrespondWith}(x,y) \ \& \ (\text{IdeateOf}(y,x) \mid \text{ObjectOf}(y,x))$ # label("Axiom VI") # label(non_clause). [assumption].

17 $\text{CanBeConceivedAsNonExisting}(x) \rightarrow \neg \text{EssenceInvExistence}(x)$ # label("Axiom VII") # label(non_clause). [assumption].

18 $\text{Substance}(x) \rightarrow \text{Being}(x)$ # label("Auxiliary assumption 1: if x is a substance, x is a being") # label(non_clause). [assumption].

19 $\text{InItself}(x) \rightarrow \text{SelfCaused}(x)$ # label("Auxiliary assumption 4: if x is in itself, x is self-caused") # label(non_clause). [assumption].

20 $\text{Being}(x) \rightarrow \text{HasEssence}(x)$ # label("Auxiliary assumption 7: If x has being, then x has essence") # label(non_clause). [assumption].

21 $\text{EssenceInvExistence}(x) \ \& \ \text{HasEssence}(x) \rightarrow \text{Exists}(x)$ # label("Auxiliary assumption 8: if the essence of x involves the existence of x and x has essence, then x exists") # label(non_clause). [assumption].

==== end of process non-clausal formulas ====

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

$\neg \text{SelfCaused}(x) \mid \text{EssenceInvExistence}(x)$ # label("Definition I: self-caused").

$\neg \text{SelfCaused}(x) \mid \text{NatureConcOnlyByExistence}(x)$ # label("Definition I: self-caused").

$\text{SelfCaused}(x) \mid \neg \text{EssenceInvExistence}(x) \mid \neg \text{NatureConcOnlyByExistence}(x)$ # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

DefiniteCause(x) # label("Deny Axiom III").

-EffectNecessarilyFollowsFrom(x,y) | -DefiniteCause(y) # label("Deny Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

1 1
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=206, kept=197.

Selections=100, assignments=100, propagations=34, current_models=1.

Rewrite_terms=0, rewrite_bools=264, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 12668 exit (max_models) Sat Mar 9 11:04:06 2019

The process finished Sat Mar 9 11:04:06 2019

APPENDIX 15. *mace4* output showing independence of Axiom 4 from DAPI conjoined with Auxiliary Assumptions 1, 4, 7, and 8.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 8912 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar  9 11:05:20 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).

    % set(print_models_tabular) -> clear(print_models).
formulas(theory).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```



```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

-(KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x)) # label("Deny Axiom
IV: The knowledge of an effect depends on and involves the knowledge
of a cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 -(KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x)) # label("Deny
Axiom IV: The knowledge of an effect depends on and involves the
knowledge of a cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Deny Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Deny Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

HaveNothingInCommon :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

IdeateOf :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

KnowledgeOfEffect :

```
| 0 1
--+----
0 | 1 1
1 | 1 1
```

Modification :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

ObjectOf :

```
| 0 1
```

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.03 seconds).

Ground clauses: seen=204, kept=195.

Selections=106, assignments=106, propagations=28, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.03, System_CPU=0.01, Wall_clock=0.

Exiting with 1 model.

Process 8912 exit (max_models) Sat Mar 9 11:05:20 2019

The process finished Sat Mar 9 11:05:20 2019

APPENDIX 16. *mace4* output showing independence of Axiom 5.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 8384 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:06:45 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").
```



```

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

-(HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x)) # label("Deny Axiom V: Things which have
nothing in common cannot be understood, the one by means of the
other. ").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

```

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

```

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 -(HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x)) # label("Deny Axiom V: Things which have
nothing in common cannot be understood, the one by means of the
other.") # label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

```

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesEternalEssentiality(y) # label("Definition VI: absolutely
infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) #
label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

HaveNothingInCommon(x,y) # label("Deny Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.>").

CanBeUnderstoodInTermsOf(x,y) | CanBeUnderstoodInTermsOf(y,x) | ConceptionInvolves(x,y) | ConceptionInvolves(y,x) # label("Deny Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.>").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

```
-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").
```

```
end_of_list.
```

```
===== end of clauses for search =====
```

```
% There are no natural numbers in the input.
```

```
===== DOMAIN SIZE 2 =====
```

```
AbsolutelyInfinite :
```

```
0 1
```

```
-----
```

```
0 0
```

```
Attribute :
```

```
0 1
```

```
-----
```

```
0 0
```

```
Being :
```

```
0 1
```

```
-----
```

```
0 0
```

```
CanBeConceivedAsNonExisting :
```

```
0 1
```

```
-----
```

```
0 0
```

```
ConceivedThruItself :
```

```
0 1
```

```
-----
```

```
0 0
```

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0

ExistConcFollowFromDefEternal :

0 1

0 0

Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0
IntPercAsConstEssSub :
0 1

0 0
IsMethodAction :
0 1

0 0
IsMethodExistence :
0 1

0 0
KnowledgeOfACause :
0 1

0 0
Mode :
0 1

0 0
NatureConcOnlyByExistence :
0 1

0 0
Necessary :

```
    0 1
-----
    0 0
SelfCaused :
    0 1
-----
    0 0
Substance :
    0 1
-----
    0 0
TrueIdea :
    0 1
-----
    0 0
ActionOf :
  | 0 1
--+----
0 | 0 0
1 | 0 0
AttributeOf :
  | 0 1
--+----
0 | 0 0
1 | 0 0
CanBeLimitedBy :
  | 0 1
```

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 1 0

1 | 1 1

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 1 1

1 | 1 1

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=196, kept=187.

Selections=99, assignments=99, propagations=35, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 8384 exit (max_models) Sat Mar 9 11:06:45 2019

The process finished Sat Mar 9 11:06:45 2019

APPENDIX 17. *mace4* output showing independence of Axiom 6.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 12440 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:07:54 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").
```



```

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

-(TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x))) # label("Deny Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

```

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

```

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 -(TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x))) # label("Deny Axiom VI") # label(non_clause).
[assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

```

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesEternalEssentiality(y) # label("Definition VI: absolutely
infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) #
label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

TrueIdea(x) # label("Deny Axiom VI").

-CorrespondWith(x,y) | -IdeateOf(y,x) # label("Deny Axiom VI").

-CorrespondWith(x,y) | -ObjectOf(y,x) # label("Deny Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0

ExistConcFollowFromDefEternal :

0 1

0 0

Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

```
-----  
    0 0  
InItself :  
    0 1  
-----  
    0 0  
IntPercAsConstEssSub :  
    0 1  
-----  
    0 0  
IsMethodAction :  
    0 1  
-----  
    0 0  
IsMethodExistence :  
    0 1  
-----  
    0 0  
KnowledgeOfACause :  
    0 1  
-----  
    0 0  
Mode :  
    0 1  
-----  
    0 0  
NatureConcOnlyByExistence :
```

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

1 1

ActionOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByFixedMethod :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByItselfAlone :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

EffectNecessarilyFollowsFrom :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

ExistsIn :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

ExternalTo :

```
| 0 1
```

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

```
1 | 0 0
SameKind :
  | 0 1
  --+----
0 | 0 0
1 | 0 0
```

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=206, kept=197.

Selections=104, assignments=104, propagations=30, current_models=1.

Rewrite_terms=0, rewrite_bools=264, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 12440 exit (max_models) Sat Mar 9 11:07:54 2019

The process finished Sat Mar 9 11:07:54 2019

APPENDIX 18. *mace4* output showing independence of Axiom 7

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 1352 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:09:06 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").
```



```

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

-(CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x)) #
label("Deny Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

```

```

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

```

```

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 -(CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x)) #
label("Deny Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

```

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesEternalEssentiality(y) # label("Definition VI: absolutely
infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) #
label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

CanBeConceivedAsNonExisting(x) # label("Deny Axiom VII").

EssenceInvExistence(x) # label("Deny Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

1 1

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

1 1

Eternity :

0 1

0 0

ExistConcFollowFromDefEternal :

0 1

0 0

Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

```
-----  
    0 0  
InItself :  
    0 1  
-----  
    0 0  
IntPercAsConstEssSub :  
    0 1  
-----  
    0 0  
IsMethodAction :  
    0 1  
-----  
    0 0  
IsMethodExistence :  
    0 1  
-----  
    0 0  
KnowledgeOfACause :  
    0 1  
-----  
    0 0  
Mode :  
    0 1  
-----  
    0 0  
NatureConcOnlyByExistence :
```

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByFixedMethod :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByItselfAlone :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

EffectNecessarilyFollowsFrom :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

ExistsIn :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

ExternalTo :

```
  | 0 1
```

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=206, kept=197.

Selections=102, assignments=102, propagations=32, current_models=1.

Rewrite_terms=0, rewrite_bools=266, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 1352 exit (max_models) Sat Mar 9 11:09:06 2019

The process finished Sat Mar 9 11:09:06 2019

APPENDIX 19. *mace4* output showing independence of Definition 1.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 10472 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar  9 11:12:07 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).

    % set(print_models_tabular) -> clear(print_models).

formulas(theory).

-(SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x)) # label("Deny Definition I: self-
caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```



```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

- 1 $\neg(\text{SelfCaused}(x) \leftrightarrow \text{EssenceInvExistence}(x) \ \& \ \text{NatureConcOnlyByExistence}(x))$ # label("Deny Definition I: self-caused") # label(non_clause). [assumption].
- 2 $\text{FiniteAfterItsKind}(x) \leftrightarrow \text{CanBeLimitedBy}(x,y) \ \& \ \text{SameKind}(x,y)$ # label("Definition II: finite after its kind") # label(non_clause). [assumption].
- 3 $\text{Substance}(x) \leftrightarrow \text{InItself}(x) \ \& \ \text{ConceivedThruItself}(x)$ # label("Definition III: substance") # label(non_clause). [assumption].
- 4 $\text{Attribute}(x) \leftrightarrow \text{IntPercAsConstEssSub}(x)$ # label("Definition IV: attribute") # label(non_clause). [assumption].
- 5 $\text{Mode}(x) \leftrightarrow \text{Modification}(x,y) \ \& \ \text{Substance}(y) \ | \ \text{ExistsIn}(x,z) \ \& \ \text{ConceivedThru}(x,z)$ # label("Definition V: mode") # label(non_clause). [assumption].
- 6 $\text{God}(x) \leftrightarrow \text{Being}(x) \ \& \ \text{AbsolutelyInfinite}(x)$ # label("Definition VI: God") # label(non_clause). [assumption].
- 7 $\text{AbsolutelyInfinite}(x) \leftrightarrow \text{Substance}(x) \ \& \ \text{ConstInInfAttributes}(x) \ \& \ (\text{AttributeOf}(y,x) \rightarrow \text{ExpressesEternalEssentiality}(y) \ \& \ \text{ExpressesInfiniteEssentiality}(y))$ # label("Definition VI: absolutely infinite") # label(non_clause). [assumption].
- 8 $\text{Free}(x) \leftrightarrow \text{ExistsOnlyByNecessityOfOwnNature}(x) \ \& \ (\text{ActionOf}(y,x) \rightarrow \text{DeterminedByItselfAlone}(y,x))$ # label("Definition VII: free") # label(non_clause). [assumption].
- 9 $\text{Necessary}(x) \leftrightarrow \text{ExternalTo}(y,x) \ \& \ \text{DeterminedByFixedMethod}(x,y) \ \& \ \text{DeterminedByDefiniteMethod}(x,y) \ \& \ (\text{IsMethodAction}(y) \ | \ \text{IsMethodExistence}(y))$ # label("Definition VII: necessary") # label(non_clause). [assumption].
- 10 $\text{Eternity}(x) \leftrightarrow \text{ExistConcFollowFromDefEternal}(x)$ # label("Definition VIII: eternity") # label(non_clause). [assumption].
- 11 $\text{Exists}(x) \leftrightarrow \text{ExistsIn}(x,x) \ | \ \text{ExistsIn}(x,y) \ \& \ x \neq y$ # label("Axiom I") # label(non_clause). [assumption].
- 12 $\neg\text{ConceivedThru}(x,x) \rightarrow \text{ConceivedThru}(x,y) \ \& \ x \neq y$ # label("Axiom II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

SelfCaused(x) | EssenceInvExistence(x) # label("Deny Definition I:
self-caused").

SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Deny Definition
I: self-caused").

-SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Deny Definition I: self-
caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

1 1

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.03 seconds).

Ground clauses: seen=204, kept=195.

Selections=108, assignments=108, propagations=26, current_models=1.

Rewrite_terms=0, rewrite_bools=260, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.03, System_CPU=0.05, Wall_clock=0.

Exiting with 1 model.

Process 10472 exit (max_models) Sat Mar 9 11:12:07 2019

The process finished Sat Mar 9 11:12:07 2019

Appendix 20. Independence of Df. 2.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 13260 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:13:58 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
-(FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y)) #
label("Deny Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").
```



```

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

```

```

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 -(FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y)) #
label("Deny Definition II: finite after its kind") #
label(non_clause). [assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

```

```

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Deny Definition
II: finite after its kind").

```

FiniteAfterItsKind(x) | SameKind(x,y) # label("Deny Definition II:
finite after its kind").

-FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) #
label("Deny Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III:
substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) #
label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V:
mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition
V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V:
mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V:
mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V:
mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI:
God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI:
absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition
VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesEternalEssentiality(y) # label("Definition VI: absolutely
infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) #
label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0

ExistConcFollowFromDefEternal :

0 1

0 0

Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

```
-----  
    0 0  
InItself :  
    0 1  
-----  
    0 0  
IntPercAsConstEssSub :  
    0 1  
-----  
    0 0  
IsMethodAction :  
    0 1  
-----  
    0 0  
IsMethodExistence :  
    0 1  
-----  
    0 0  
KnowledgeOfACause :  
    0 1  
-----  
    0 0  
Mode :  
    0 1  
-----  
    0 0  
NatureConcOnlyByExistence :
```

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 1 1

1 | 1 1

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByFixedMethod :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByItselfAlone :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

EffectNecessarilyFollowsFrom :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

ExistsIn :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

ExternalTo :

```
  | 0 1
```

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

```
1 | 0 0
SameKind :
  | 0 1
  --+----
0 | 1 1
1 | 1 1
```

===== STATISTICS =====

For domain size 2.
Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).
Ground clauses: seen=204, kept=195.
Selections=98, assignments=98, propagations=36, current_models=1.
Rewrite_terms=0, rewrite_bools=266, indexes=0.
Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.
Exiting with 1 model.
Process 13260 exit (max_models) Sat Mar 9 11:13:58 2019
The process finished Sat Mar 9 11:13:58 2019

APPENDIX 21. *mace4* output showing independence of Definition 3.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 7624 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:15:37 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
-(Substance(x) <-> InItself(x) & ConceivedThruItself(x)) # label("Deny
Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```



```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 -(Substance(x) <-> InItself(x) & ConceivedThruItself(x)) #
label("Deny Definition III: substance") # label(non_clause).
[assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

Substance(x) | InItself(x) # label("Deny Definition III: substance").

Substance(x) | ConceivedThruItself(x) # label("Deny Definition III: substance").

-Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Deny Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

1 1
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

1 1
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

1 1

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

1 1

Necessary :

0 1

0 0

SelfCaused :

0 1

1 1

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=204, kept=195.

Selections=96, assignments=96, propagations=38, current_models=1.

Rewrite_terms=0, rewrite_bools=272, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 7624 exit (max_models) Sat Mar 9 11:15:37 2019

The process finished Sat Mar 9 11:15:37 2019

APPENDIX 22. *mace4* output showing independence of Definition 4.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 13220 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:16:57 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
-(Attribute(x) <-> IntPercAsConstEssSub(x)) # label("Deny Definition
IV: attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").
```



```

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

```

```

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 -(Attribute(x) <-> IntPercAsConstEssSub(x)) # label("Deny Definition
IV: attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

```

```

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

===== end of process non-clausal formulas =====
===== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II:
finite after its kind").

```

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

Attribute(x) | IntPercAsConstEssSub(x) # label("Deny Definition IV: attribute").

-Attribute(x) | -IntPercAsConstEssSub(x) # label("Deny Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesEternalEssentiality(y) # label("Definition VI: absolutely
infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) |
ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely
infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) |
-ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) #
label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition
VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) #
label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) |
-DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII:
necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition
VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) #
label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) |
-DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) #
label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) # label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

==== end of clauses for search =====

% There are no natural numbers in the input.

==== DOMAIN SIZE 2 =====

AbsolutelyInfinite :

0 1

0 0

Attribute :

0 1

0 0

Being :

0 1

0 0

CanBeConceivedAsNonExisting :

0 1

0 0

ConceivedThruItself :

0 1

0 0

ConstInInfAttributes :

0 1

0 0

DefiniteCause :

0 1

0 0

EssenceInvExistence :

0 1

0 0

Eternity :

0 1

0 0

ExistConcFollowFromDefEternal :

0 1

0 0

Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

```
-----  
    0 0  
InItself :  
    0 1  
-----  
    0 0  
IntPercAsConstEssSub :  
    0 1  
-----  
    1 1  
IsMethodAction :  
    0 1  
-----  
    0 0  
IsMethodExistence :  
    0 1  
-----  
    0 0  
KnowledgeOfACause :  
    0 1  
-----  
    0 0  
Mode :  
    0 1  
-----  
    0 0  
NatureConcOnlyByExistence :
```

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByFixedMethod :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

DeterminedByItselfAlone :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

EffectNecessarilyFollowsFrom :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

ExistsIn :

```
  | 0 1
--+----
0 | 0 0
1 | 0 0
```

ExternalTo :

```
  | 0 1
```

---+-----

0 | 0 0

1 | 0 0

HaveNothingInCommon :

| 0 1

---+-----

0 | 0 0

1 | 0 0

IdeateOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

KnowledgeOfEffect :

| 0 1

---+-----

0 | 0 0

1 | 0 0

Modification :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.03 seconds).

Ground clauses: seen=204, kept=195.

Selections=106, assignments=106, propagations=28, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.03, System_CPU=0.01, Wall_clock=0.

Exiting with 1 model.

Process 13220 exit (max_models) Sat Mar 9 11:16:57 2019

The process finished Sat Mar 9 11:16:57 2019

APPENDIX 23. *mace4* output showing independence of Definition 5.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 2600 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar  9 11:18:12 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
-(Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z)) # label("Deny Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
```



```

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

```

===== end of input =====

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 -(Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z)) # label("Deny Definition V: mode") #
label(non_clause). [assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Deny Definition V: mode").

Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Deny Definition V: mode").

Mode(x) | Substance(y) | ExistsIn(x,z) # label("Deny Definition V: mode").

Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Deny Definition V: mode").

-Mode(x) | -Modification(x,y) | -Substance(y) # label("Deny Definition V: mode").

-Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Deny Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

1 1

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.05 seconds).

Ground clauses: seen=204, kept=195.

Selections=106, assignments=106, propagations=28, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.05, System_CPU=0.00, Wall_clock=0.

Exiting with 1 model.

Process 2600 exit (max_models) Sat Mar 9 11:18:12 2019

The process finished Sat Mar 9 11:18:12 2019

APPENDIX 24. *mace4* output showing independence of Definition 6A (“God”).

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 6176 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar  9 11:19:39 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
-(God(x) <-> Being(x) & AbsolutelyInfinite(x)) # label("Deny
Definition VI: God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```



```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 -(God(x) <-> Being(x) & AbsolutelyInfinite(x)) # label("Deny
Definition VI: God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

God(x) | Being(x) # label("Deny Definition VI: God").

God(x) | AbsolutelyInfinite(x) # label("Deny Definition VI: God").

-God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Deny Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :
0 1

0 0
God :
0 1

1 1

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=204, kept=195.

Selections=106, assignments=106, propagations=28, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.05, Wall_clock=0.

Exiting with 1 model.

Process 6176 exit (max_models) Sat Mar 9 11:19:39 2019

The process finished Sat Mar 9 11:19:39 2019

APPENDIX 25. *mace4* output showing independence of Definition 6B (“AbsolutelyInfinite”).

```
===== Mace4 =====  
Mace4 (32) version 2009-11A, November 2009.  
Process 964 was started by #AUTHOR on DESKTOP-AM4IKPU,  
Sat Mar 9 11:20:53 2019  
The command was "../bin/mace4".  
===== end of head =====  
===== INPUT =====  
set(print_models_tabular).  
    % set(print_models_tabular) -> clear(print_models).  
formulas(theory).  
SelfCaused(x) <-> EssenceInvExistence(x) &  
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").  
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #  
label("Definition II: finite after its kind").  
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #  
label("Definition III: substance").  
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:  
attribute").  
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &  
ConceivedThru(x,z) # label("Definition V: mode").  
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:  
God").  
-(AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &  
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &  
ExpressesInfiniteEssentiality(y))) # label("Deny Definition VI:  
absolutely infinite").
```



```

Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

```

==== end of input =====

==== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 -(AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y))) # label("Deny Definition VI:
absolutely infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

AbsolutelyInfinite(x) | Substance(x) # label("Deny Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Deny Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Deny Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Deny Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Deny Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Deny Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0
Attribute :
    0 1
    -----
    0 0
Being :
    0 1
    -----
    1 1
CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

1 1
ConstInInfAttributes :
0 1

1 1
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

1 1
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

 1 1
 ExistsOnlyByNecessityOfOwnNature :
 0 1

 0 0
 ExpressesEternalEssentiality :
 0 1

 0 0
 ExpressesInfiniteEssentiality :
 0 1

 0 0
 FiniteAfterItsKind :
 0 1

 0 0
 Free :
 0 1

 0 0
 God :
 0 1

 0 0

HasEssence :

0 1

1 1

InItself :

0 1

1 1

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

1 1

NatureConcOnlyByExistence :

0 1

1 1

Necessary :

0 1

0 0

SelfCaused :

0 1

1 1

Substance :

0 1

1 1

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 1

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 1 1

1 | 0 1

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 1 1

ObjectOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

--+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.03 seconds).

Ground clauses: seen=204, kept=195.

Selections=84, assignments=84, propagations=50, current_models=1.

Rewrite_terms=0, rewrite_bools=283, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.03, System_CPU=0.01, Wall_clock=0.

Exiting with 1 model.

Process 964 exit (max_models) Sat Mar 9 11:20:53 2019

The process finished Sat Mar 9 11:20:53 2019

APPENDIX 26. *mace4* output showing independence of Definition 7A (“Free”).

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 8492 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:22:21 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====

set(print_models_tabular).

    % set(print_models_tabular) -> clear(print_models).

formulas(theory).

SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").

Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").

Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").

Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").

God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").

AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").

-(Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x))) # label("Deny Definition VII: free").
```



```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other. ").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 -(Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x)
-> DeterminedByItselfAlone(y,x))) # label("Deny Definition VII:
free") # label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Deny Definition VII: free").

Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Deny Definition VII: free").

-Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Deny Definition VII: free").

-Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Deny Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0
ExistsOnlyByNecessityOfOwnNature :
0 1

0 0
ExpressesEternalEssentiality :
0 1

0 0
ExpressesInfiniteEssentiality :
0 1

0 0
FiniteAfterItsKind :
0 1

0 0
Free :
0 1

1 1
God :
0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.05 seconds).

Ground clauses: seen=204, kept=195.

Selections=106, assignments=106, propagations=28, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.05, System_CPU=0.00, Wall_clock=0.

Exiting with 1 model.

Process 8492 exit (max_models) Sat Mar 9 11:22:21 2019

The process finished Sat Mar 9 11:22:21 2019

APPENDIX 27. *mace4* output showing independence of Definition 7B (“Necessary”).

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 10712 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar  9 11:23:38 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```



```

-(Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y))) # label("Deny Definition VII: necessary").

Eternity(x) <-> ExistConcFollowFromDefEternal(x) # label("Definition
VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 -(Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y))) # label("Deny Definition VII: necessary") #
label(non_clause). [assumption].

10 Eternity(x) <-> ExistConcFollowFromDefEternal(x) #
label("Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Necessary(x) | ExternalTo(y,x) # label("Deny Definition VII: necessary").

Necessary(x) | DeterminedByFixedMethod(x,y) # label("Deny Definition VII: necessary").

Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Deny Definition VII: necessary").

Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Deny Definition VII: necessary").

-Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Deny Definition VII: necessary").

-Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Deny Definition VII: necessary").

-Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The knowledge of an effect depends on and involves the knowledge of a cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing in common cannot be understood, the one by means of the other.").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

0 0
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

1 1

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

HaveNothingInCommon :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

IdeateOf :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

KnowledgeOfEffect :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

Modification :

```
| 0 1
--+----
0 | 0 0
1 | 0 0
```

ObjectOf :

```
| 0 1
```

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.01 seconds).

Ground clauses: seen=204, kept=195.

Selections=106, assignments=106, propagations=28, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.01, System_CPU=0.03, Wall_clock=0.

Exiting with 1 model.

Process 10712 exit (max_models) Sat Mar 9 11:23:38 2019

The process finished Sat Mar 9 11:23:38 2019

APPENDIX 28. *mace4* output showing independence of Definition 8.

```
===== Mace4 =====
Mace4 (32) version 2009-11A, November 2009.
Process 12888 was started by #AUTHOR on DESKTOP-AM4IKPU,
Sat Mar 9 11:24:55 2019
The command was "../bin/mace4".
===== end of head =====
===== INPUT =====
set(print_models_tabular).
    % set(print_models_tabular) -> clear(print_models).
formulas(theory).
SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused").
FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind").
Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance").
Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute").
Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode").
God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God").
AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite").
Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free").
```



```

Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary").

-(Eternity(x) <-> ExistConcFollowFromDefEternal(x)) # label("Deny
Definition VIII: eternity").

Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I").

-ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II").

DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III").

KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.").

TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) | ObjectOf(y,x)) #
label("Axiom VI").

CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII").

Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

EssenceInvExistence(x) & HasEssence(x) -> Exists(x) # label("Auxiliary
assumption 8: if the essence of x involves the existence of x and x
has essence, then x exists").

end_of_list.

===== end of input =====

```

===== PROCESS NON-CLAUSAL FORMULAS =====

% Formulas that are not ordinary clauses:

1 SelfCaused(x) <-> EssenceInvExistence(x) &
NatureConcOnlyByExistence(x) # label("Definition I: self-caused") #
label(non_clause). [assumption].

2 FiniteAfterItsKind(x) <-> CanBeLimitedBy(x,y) & SameKind(x,y) #
label("Definition II: finite after its kind") # label(non_clause).
[assumption].

3 Substance(x) <-> InItself(x) & ConceivedThruItself(x) #
label("Definition III: substance") # label(non_clause). [assumption].

4 Attribute(x) <-> IntPercAsConstEssSub(x) # label("Definition IV:
attribute") # label(non_clause). [assumption].

5 Mode(x) <-> Modification(x,y) & Substance(y) | ExistsIn(x,z) &
ConceivedThru(x,z) # label("Definition V: mode") # label(non_clause).
[assumption].

6 God(x) <-> Being(x) & AbsolutelyInfinite(x) # label("Definition VI:
God") # label(non_clause). [assumption].

7 AbsolutelyInfinite(x) <-> Substance(x) & ConstInInfAttributes(x) &
(AttributeOf(y,x) -> ExpressesEternalEssentiality(y) &
ExpressesInfiniteEssentiality(y)) # label("Definition VI: absolutely
infinite") # label(non_clause). [assumption].

8 Free(x) <-> ExistsOnlyByNecessityOfOwnNature(x) & (ActionOf(y,x) ->
DeterminedByItselfAlone(y,x)) # label("Definition VII: free") #
label(non_clause). [assumption].

9 Necessary(x) <-> ExternalTo(y,x) & DeterminedByFixedMethod(x,y) &
DeterminedByDefiniteMethod(x,y) & (IsMethodAction(y) |
IsMethodExistence(y)) # label("Definition VII: necessary") #
label(non_clause). [assumption].

10 -(Eternity(x) <-> ExistConcFollowFromDefEternal(x)) # label("Deny
Definition VIII: eternity") # label(non_clause). [assumption].

11 Exists(x) <-> ExistsIn(x,x) | ExistsIn(x,y) & x != y # label("Axiom
I") # label(non_clause). [assumption].

12 -ConceivedThru(x,x) -> ConceivedThru(x,y) & x != y # label("Axiom
II") # label(non_clause). [assumption].

13 DefiniteCause(x) -> EffectNecessarilyFollowsFrom(y,x) & (-
DefiniteCause(x) -> -EffectNecessarilyFollowsFrom(y,x)) # label("Axiom
III") # label(non_clause). [assumption].

14 KnowledgeOfEffect(x,y) <-> KnowledgeOfACause(x) # label("Axiom IV:
The knowledge of an effect depends on and involves the knowledge of a
cause") # label(non_clause). [assumption].

15 HaveNothingInCommon(x,y) -> -CanBeUnderstoodInTermsOf(x,y) &
-CanBeUnderstoodInTermsOf(y,x) & -ConceptionInvolves(x,y) &
-ConceptionInvolves(y,x) # label("Axiom V: Things which have nothing
in common cannot be understood, the one by means of the other.") #
label(non_clause). [assumption].

16 TrueIdea(x) -> CorrespondWith(x,y) & (IdeateOf(y,x) |
ObjectOf(y,x)) # label("Axiom VI") # label(non_clause). [assumption].

17 CanBeConceivedAsNonExisting(x) -> -EssenceInvExistence(x) #
label("Axiom VII") # label(non_clause). [assumption].

18 Substance(x) -> Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being") # label(non_clause). [assumption].

19 InItself(x) -> SelfCaused(x) # label("Auxiliary assumption 4: if x
is in itself, x is self-caused") # label(non_clause). [assumption].

20 Being(x) -> HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence") # label(non_clause). [assumption].

21 EssenceInvExistence(x) & HasEssence(x) -> Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists") # label(non_clause).
[assumption].

==== end of process non-clausal formulas ===

==== CLAUSES FOR SEARCH =====

formulas(mace4_clauses).

-SelfCaused(x) | EssenceInvExistence(x) # label("Definition I: self-
caused").

-SelfCaused(x) | NatureConcOnlyByExistence(x) # label("Definition I:
self-caused").

SelfCaused(x) | -EssenceInvExistence(x) |
-NatureConcOnlyByExistence(x) # label("Definition I: self-caused").

-FiniteAfterItsKind(x) | CanBeLimitedBy(x,y) # label("Definition II: finite after its kind").

-FiniteAfterItsKind(x) | SameKind(x,y) # label("Definition II: finite after its kind").

FiniteAfterItsKind(x) | -CanBeLimitedBy(x,y) | -SameKind(x,y) # label("Definition II: finite after its kind").

-Substance(x) | InItself(x) # label("Definition III: substance").

-Substance(x) | ConceivedThruItself(x) # label("Definition III: substance").

Substance(x) | -InItself(x) | -ConceivedThruItself(x) # label("Definition III: substance").

-Attribute(x) | IntPercAsConstEssSub(x) # label("Definition IV: attribute").

Attribute(x) | -IntPercAsConstEssSub(x) # label("Definition IV: attribute").

-Mode(x) | Modification(x,y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Modification(x,y) | ConceivedThru(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ExistsIn(x,z) # label("Definition V: mode").

-Mode(x) | Substance(y) | ConceivedThru(x,z) # label("Definition V: mode").

Mode(x) | -Modification(x,y) | -Substance(y) # label("Definition V: mode").

Mode(x) | -ExistsIn(x,y) | -ConceivedThru(x,y) # label("Definition V: mode").

-God(x) | Being(x) # label("Definition VI: God").

-God(x) | AbsolutelyInfinite(x) # label("Definition VI: God").

God(x) | -Being(x) | -AbsolutelyInfinite(x) # label("Definition VI: God").

-AbsolutelyInfinite(x) | Substance(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | ConstInInfAttributes(x) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesEternalEssentiality(y) # label("Definition VI: absolutely infinite").

-AbsolutelyInfinite(x) | -AttributeOf(y,x) | ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | AttributeOf(y,x) # label("Definition VI: absolutely infinite").

AbsolutelyInfinite(x) | -Substance(x) | -ConstInInfAttributes(x) | -ExpressesEternalEssentiality(y) | -ExpressesInfiniteEssentiality(y) # label("Definition VI: absolutely infinite").

-Free(x) | ExistsOnlyByNecessityOfOwnNature(x) # label("Definition VII: free").

-Free(x) | -ActionOf(y,x) | DeterminedByItselfAlone(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | ActionOf(y,x) # label("Definition VII: free").

Free(x) | -ExistsOnlyByNecessityOfOwnNature(x) | -DeterminedByItselfAlone(y,x) # label("Definition VII: free").

-Necessary(x) | ExternalTo(y,x) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByFixedMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | DeterminedByDefiniteMethod(x,y) # label("Definition VII: necessary").

-Necessary(x) | IsMethodAction(y) | IsMethodExistence(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodAction(y) # label("Definition VII: necessary").

Necessary(x) | -ExternalTo(y,x) | -DeterminedByFixedMethod(x,y) | -DeterminedByDefiniteMethod(x,y) | -IsMethodExistence(y) # label("Definition VII: necessary").

Eternity(x) | ExistConcFollowFromDefEternal(x) # label("Deny
Definition VIII: eternity").

-Eternity(x) | -ExistConcFollowFromDefEternal(x) # label("Deny
Definition VIII: eternity").

-Exists(x) | ExistsIn(x,x) | ExistsIn(x,y) # label("Axiom I").

-Exists(x) | ExistsIn(x,x) | y != x # label("Axiom I").

Exists(x) | -ExistsIn(x,x) # label("Axiom I").

Exists(x) | -ExistsIn(x,y) | y = x # label("Axiom I").

ConceivedThru(x,x) | ConceivedThru(x,y) # label("Axiom II").

ConceivedThru(x,x) | y != x # label("Axiom II").

-DefiniteCause(x) | EffectNecessarilyFollowsFrom(y,x) # label("Axiom
III").

-KnowledgeOfEffect(x,y) | KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

KnowledgeOfEffect(x,y) | -KnowledgeOfACause(x) # label("Axiom IV: The
knowledge of an effect depends on and involves the knowledge of a
cause").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(x,y) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.>").

-HaveNothingInCommon(x,y) | -CanBeUnderstoodInTermsOf(y,x) #
label("Axiom V: Things which have nothing in common cannot be
understood, the one by means of the other.>").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(x,y) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.>").

-HaveNothingInCommon(x,y) | -ConceptionInvolves(y,x) # label("Axiom V:
Things which have nothing in common cannot be understood, the one by
means of the other.>").

-TrueIdea(x) | CorrespondWith(x,y) # label("Axiom VI").

-TrueIdea(x) | IdeateOf(y,x) | ObjectOf(y,x) # label("Axiom VI").

```

-CanBeConceivedAsNonExisting(x) | -EssenceInvExistence(x) #
label("Axiom VII").

-Substance(x) | Being(x) # label("Auxiliary assumption 1: if x is a
substance, x is a being").

-InItself(x) | SelfCaused(x) # label("Auxiliary assumption 4: if x is
in itself, x is self-caused").

-Being(x) | HasEssence(x) # label("Auxiliary assumption 7: If x has
being, then x has essence").

-EssenceInvExistence(x) | -HasEssence(x) | Exists(x) #
label("Auxiliary assumption 8: if the essence of x involves the
existence of x and x has essence, then x exists").

end_of_list.

===== end of clauses for search =====

% There are no natural numbers in the input.

===== DOMAIN SIZE 2 =====

AbsolutelyInfinite :
    0 1
    -----
    0 0

Attribute :
    0 1
    -----
    0 0

Being :
    0 1
    -----
    0 0

CanBeConceivedAsNonExisting :
    0 1

```

0 0
ConceivedThruItself :
0 1

0 0
ConstInInfAttributes :
0 1

0 0
DefiniteCause :
0 1

0 0
EssenceInvExistence :
0 1

0 0
Eternity :
0 1

0 0
ExistConcFollowFromDefEternal :
0 1

1 1
Exists :

0 1

0 0

ExistsOnlyByNecessityOfOwnNature :

0 1

0 0

ExpressesEternalEssentiality :

0 1

0 0

ExpressesInfiniteEssentiality :

0 1

0 0

FiniteAfterItsKind :

0 1

0 0

Free :

0 1

0 0

God :

0 1

0 0

HasEssence :

0 1

0 0

InItself :

0 1

0 0

IntPercAsConstEssSub :

0 1

0 0

IsMethodAction :

0 1

0 0

IsMethodExistence :

0 1

0 0

KnowledgeOfACause :

0 1

0 0

Mode :

0 1

0 0

NatureConcOnlyByExistence :

0 1

0 0

Necessary :

0 1

0 0

SelfCaused :

0 1

0 0

Substance :

0 1

0 0

TrueIdea :

0 1

0 0

ActionOf :

| 0 1

--+-----

0 | 0 0

1 | 0 0

AttributeOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeLimitedBy :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CanBeUnderstoodInTermsOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ConceivedThru :

| 0 1

---+-----

0 | 1 0

1 | 0 1

ConceptionInvolves :

| 0 1

---+-----

0 | 0 0

1 | 0 0

CorrespondWith :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByDefiniteMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByFixedMethod :

| 0 1

---+-----

0 | 0 0

1 | 0 0

DeterminedByItselfAlone :

| 0 1

---+-----

0 | 0 0

1 | 0 0

EffectNecessarilyFollowsFrom :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExistsIn :

| 0 1

---+-----

0 | 0 0

1 | 0 0

ExternalTo :

| 0 1
--+-----
0 | 0 0
1 | 0 0

HaveNothingInCommon :

| 0 1
--+-----
0 | 0 0
1 | 0 0

IdeateOf :

| 0 1
--+-----
0 | 0 0
1 | 0 0

KnowledgeOfEffect :

| 0 1
--+-----
0 | 0 0
1 | 0 0

Modification :

| 0 1
--+-----
0 | 0 0
1 | 0 0

ObjectOf :

| 0 1

---+-----

0 | 0 0

1 | 0 0

SameKind :

| 0 1

---+-----

0 | 0 0

1 | 0 0

===== STATISTICS =====

For domain size 2.

Current CPU time: 0.00 seconds (total CPU time: 0.03 seconds).

Ground clauses: seen=204, kept=195.

Selections=106, assignments=106, propagations=28, current_models=1.

Rewrite_terms=0, rewrite_bools=262, indexes=0.

Rules_from_neg_clauses=0, cross_offs=0.

===== end of statistics =====

User_CPU=0.03, System_CPU=0.01, Wall_clock=0.

Exiting with 1 model.

Process 12888 exit (max_models) Sat Mar 9 11:24:55 2019

The process finished Sat Mar 9 11:24:55 2019

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