Preface

This book is a result of a long and fruitful cooperation between the authors who devoted time and experience to introduce Matlab in bachelor's and master's degree courses in industrial chemistry at the University of Naples Federico II, in the frame of the Chemical Sciences Department. The efforts were able to extend the approach to research in cooperation with industrial and academic partners, leading to a wide number of scientific publications.

The presented approach is oriented on the simulation of chemical reactors using Matlab software, describing in detail how to implement the mass and heat balance equations. The idea is to teach the audience how to use the built-in Matlab functions in a correct and efficient manner, developing numeric tools in describing experimental data collected using both lab- and pilot plant-scale reactors.

Many books are available on the market regarding chemical reactors description, ranging from basic to advanced approaches on the topic. Notwithstanding this very large published material, very few of them offer the reader a modern approach to reactor description and modeling. Our idea is based on the use of a widely spread numerical environment, Matlab, to develop categorized groups of generalized codes. Examples of application will be reported for every reactor treated in this book. For practical reasons, no specific molecules will be considered in describing chemical reactions, preferring a more general schematization (e.g., $A \rightarrow B$). This is necessary to keep the codes compact and help readers in adapting the models to their real applications. The codes presented in the book aim both to simulate almost each type of chemical reactor and to be easily extended and adapted by the reader to their own specific problem; thus, it represents a useful tool for professionals working in industry and academy.

The main difference, and contemporarily the strong point of this book, is the general validity of the developed codes when problems in reactor simulation arise. The codes are not dedicated to specific chemical systems but are of general validity and are not only demonstrative examples but, instead, also used in reality. Finally, the modular approach adopted in the book could be exploited by advanced readers to combine and further develop the codes into a more complex process simulation.

The concluding chapter is devoted to the presentation of real examples of application, choosing modern examples of chemical reaction engineering to show the high potentialities of the presented approaches. In this case, the codes are not provided for lengthy reasons; therefore, both the theory and the calculation strategies given by general flow charts are given to help readers develop their own code.

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In faith,
Prof. Riccardo Tesser, Prof. Vincenzo Russo