

List of Notations

Operations and Symbols

$:=$	equal by definition
$\langle \cdot, \cdot \rangle$	scalar product
\times	cartesian product
$x \rightarrow \bar{x}$	x converges to \bar{x}
$x \xrightarrow{A} \bar{x}$	$x \rightarrow \bar{x}$ with $x \in A$
$x \xrightarrow{f} \bar{x}$	$x \rightarrow \bar{x}$ with $f(x) \rightarrow f(\bar{x})$
$x_n \rightarrow \bar{x}, (x_n) \rightarrow \bar{x}$	sequence (x_n) has the limit \bar{x}
$x_n \xrightarrow{A} \bar{x}$	$x \rightarrow \bar{x}$ with $(x_n) \subset A$
\lim	limit (for sequences or functions)
\liminf	lower limit
\limsup	upper limit
$\ \cdot\ $	Euclidean norm of \mathbb{R}^p , $p > 1$
$ \cdot $	modulus (on \mathbb{R})
\square	end of proof/solution

Sets and Spaces

\emptyset	empty set
\mathbb{N}	set of natural numbers
\mathbb{N}^*	$\mathbb{N} \setminus \{0\}$
\mathbb{Z}	set of integers
\mathbb{Q}	set of rational numbers
\mathbb{R}	set of real numbers
$\mathbb{R}^p, p \in \mathbb{N}^*$	p -dimensional Euclidean space
\mathbb{R}_+^p	positive orthant of \mathbb{R}^p
$B(x, r)$	open ball of center x and radius r
$D(x, r)$	closed ball of center x and radius r
$S(x, r)$	sphere of center x and radius r
$\text{int } A$	interior of the set A
$\text{cl } A$	closure of the set A
$\text{bd } A$	boundary of the set A

$\text{conv } A$	convex hull of the set A
$\text{cone } A$	conic hull of the set A
A^-	polar of the set A
$T_B(A, \bar{x})$	Bouligand tangent cone to A at \bar{x}
$T_C(A, \bar{x})$	Clarke tangent cone to A at \bar{x}
$N(A, \bar{x})$	normal cone to the convex set A at \bar{x}
$N_B(A, \bar{x})$	Bouligand normal cone to A at \bar{x}
$N_C(A, \bar{x})$	Clarke normal cone to A at \bar{x}
$N_F(A, \bar{x})$	Fréchet normal cone to A at \bar{x}
$N_M(A, \bar{x})$	Mordukhovich normal cone to A at \bar{x}
$\partial f(\bar{x})$	convex subdifferential of f at \bar{x}
$\partial_C f(\bar{x})$	Clarke subdifferential of f at \bar{x}
$\partial_F f(\bar{x})$	Fréchet subdifferential of f at \bar{x}
$\partial_M f(\bar{x})$	Mordukhovich subdifferential of f at \bar{x}
$\partial^\infty f(\bar{x})$	singular subdifferential of f at \bar{x}
$\text{pr}_A \bar{x}$	projection set of \bar{x} on A
$\text{rank } A$	rank of the matrix A
A^t, x^t	transpose of the matrix A /vector x
$\dim X$	dimension of the linear (sub)space X

Functions

$f : A \rightarrow B$	function from A to B
f^{-1}	inverse of f
$f \circ g$	composition of functions
$\text{gr } f$	graph of f
$\text{epi } f$	epigraph of f
$N_\nu f$	ν -level set of f
$\text{dom } f$	domain of f
$\text{Ker } T$	kernel of the linear operator T
$\text{Im } f$	image of the mapping f
$\nabla f(\bar{x})$	gradient of f at \bar{x}
$\nabla^2 f(\bar{x})$	second order differential of f at \bar{x}
f^*	conjugate of f
$d_A, d(\cdot, A)$	distance function to the set A
Δ_A	oriented distance function to the set A
s_e	Gerstewitz (Tammer) scalarization functional