List of Notations

Operations and Symbols

$:=$	equal by definition
$\langle \cdot, \cdot \rangle$	scalar product
$\times$	cartesian product
$x \to \overline{x}$	x converges to $\overline{x}$
$x \xrightarrow{A} \overline{x}$	$x \to \overline{x}$ with $x \in A$
$x \xrightarrow{f} \overline{x}$	$x \to \overline{x}$ with $f(x) \to f(\overline{x})$
$x_n \to \overline{x}$, $(x_n) \to \overline{x}$	sequence (x_n) has the limit $\overline{x}$
$x_n \xrightarrow{A} \overline{x}$	$x \to \overline{x}$ 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
$\mathbb{N}^\star$	$\mathbb{N} \setminus \{0\}$
$\mathbb{Z}$	set of integers
$\mathbb{Q}$	set of rational numbers
$\mathbb{R}$	set of real numbers
$\mathbb{R}^p$, $p \in \mathbb{N}^\star$	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
$\operatorname{int} A$	interior of the set A
$\operatorname{cl} A$	closure of the set A
$\operatorname{bd} A$	boundary of the set A

$\operatorname{conv} A$	convex hull of the set A
$\operatorname{cone} A$	conic hull of the set A
A^-	polar of the set A
$T_B(A, \overline{x})$	Bouligand tangent cone to A at $\overline{x}$
$T_C(A, \overline{x})$	Clarke tangent cone to A at $\overline{x}$
$N(A, \overline{x})$	normal cone to the convex set A at $\overline{x}$
$N_B(A, \overline{x})$	Bouligand normal cone to A at $\overline{x}$
$N_C(A, \overline{x})$	Clarke normal cone to A at $\overline{x}$
$N_F(A, \overline{x})$	Fréchet normal cone to A at $\overline{x}$
$N_M(A, \overline{x})$	Mordukhovich normal cone to A at $\overline{x}$
$\partial f(\overline{x})$	convex subdifferential of f at $\overline{x}$
$\partial_C f(\overline{x})$	Clarke subdifferential of f at $\overline{x}$
$\partial_F f(\overline{x})$	Fréchet subdifferential of f at $\overline{x}$
$\partial_M f(\overline{x})$	Mordukhovich subdifferential of f at $\overline{x}$
$\partial^\infty f(\overline{x})$	singular subdifferential of f at $\overline{x}$
$\operatorname{pr}_A \overline{x}$	projection set of $\overline{x}$ on A
$\operatorname{rank} A$	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

$f : A \to B$	function from A to B
f^{-1}	inverse of f
$f \circ g$	composition of functions
$\operatorname{gr} f$	graph of f
$\operatorname{epi} f$	epigraph of f
$N_v f$	v-level set of f
$\operatorname{dom} f$	domain of f
$\operatorname{Ker} T$	kernel of the linear operator T
$\operatorname{Im} f$	image of the mapping f
$\nabla f(\overline{x})$	gradient of f at $\overline{x}$
$\nabla^2 f(\overline{x})$	second order differential of f at $\overline{x}$
$f^\star$	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