List of symbols

Number sets and vector spaces	
$\mathbf{N}, \mathbf{Z}, \mathbf{Q}, \mathbf{R}, \mathbf{C}$	set of natural, integer, rational, real and complex numbers
$\mathbf{R}^n$	set of all real n-tuples
$\mathbf{S}^{n-1}$	unit sphere of $\mathbf{R}^n$
$\mathbf{R}^n_+$	$\mathbf{R}^n \cap \{x_n \geq 0\}$
$\mathbf{C}^n$	set of all complex n-tuples
$a \wedge b, a \vee b$	minimum and maximum of a and b
$\lvert\alpha\rvert$	the length of the multi-index α, i.e. $\lvert\alpha\rvert = \alpha_1 + \cdots + \alpha_n$
$\mathrm{Re}\,\lambda$, $\mathrm{Im}\,\lambda$	real and imaginary part of $\lambda \in \mathbf{C}$
$\#E$	the cardinality of the set E
Topological and metric space notation	
$\overline{E}$	topological closure of E
∂E	topological boundary of E
E^c	the complementary set of E in a domain Ω or in $\mathbf{R}^n$
$E \subset\subset F$	$\overline{E} \subset F, \overline{E}$ compact
$B(x_0, r)$	open ball with center x and radius r
$B^+(0, r)$	$B(0, r) \cap \mathbf{R}^n_+$
$\mathcal{L}(X, Y)$	set of bounded and linear operators from X to Y
$\mathcal{L}(X)$	$\mathcal{L}(X, X)$
X'	dual space of the Banach space X

Matrix and linear algebra	
I	the identity matrix
$\det B$	the determinant of the matrix B
e_i	i-th vector of the canonical basis of $\mathbf{R}^n$
$\mathrm{Tr} B$	the trace of the matrix B
$\\|B\\|_\infty$	the Euclidean norm of the matrix B, i.e. $(\sum_{i,j=1}^n b_{ij}^2)^{1/2}$
$\\|B\\|_{1,\infty}$	$(\sum_{i,j,h=1}^n \lvert D_h b_{ij}\rvert^2)^{1/2}$
$\\|B\\|_{2,\infty}$	$(\sum_{i,j,h,k=1}^n \lvert D_{hk} b_{ij}\rvert^2)^{1/2}$
$\langle\cdot,\cdot\rangle$ or $x\cdot y$	the Euclidean inner product between the vectors $x, y \in \mathbf{R}^n$
Function spaces: let $f : X \to Y$	
$f \llcorner E$ or $f_{\lvert E}$	restriction of f to $E \subset X$
$\mathrm{supp}\, f$	closure of $\{x \in X : f(x) \neq 0\}$
χ_E	characteristic function of the set E
u_t	partial derivative with respect to t
D_i	partial derivative with respect to x_i
D_{ij}	$D_i D_j$
Du	space gradient of a real-valued function u
$D^2 u$	Hessian matrix of a real-valued function u
Δu	$\mathrm{Tr}(D^2 u)$
$C(X, Y)$	space of continuous functions from X into Y
$C(\Omega)$	space of continuous functions valued in $\mathbf{R}$ or $\mathbf{C}$
$C_c(\Omega)$	functions in $C(\Omega)$ with compact support in Ω
$C_0(\Omega)$	closure in the sup norm of $C_c(\Omega)$
$UC_b(\Omega)$	space of the uniformly continuous and bounded functions on Ω
$C_b^k(\overline{\Omega})$	space of k-times differentiable functions with $D^m f$ for $\lvert m\rvert \le k$ bounded and continuous up to the boundary
$C^\alpha(\Omega)$	space of α-Hölder continuous functions, $\alpha \in (0,1)$
$C^{k,\alpha}(\Omega)$	space of $f \in C^k(\Omega)$ with $D^m f \in C^\alpha(\Omega)$ for $\lvert m\rvert \le k$ and $\alpha \in (0,1)$
$\mathcal{S}(\mathbf{R}^n)$	Schwartz space of rapidly decreasing functions
$[u]_{C^\alpha(\Omega)}$	the seminorm $\sup_{x,y\in\Omega} \frac{\lvert u(x)-u(y)\rvert}{\lvert x-y\rvert^\alpha}$
$\\|\cdot\\|_{L^\infty(\Omega)}$	sup norm
$\\|u\\|_{C^{k,\alpha}(\Omega)}$	$\sum_{\lvert\alpha\rvert\le k} \\|D^\alpha u\\|_{L^\infty(\Omega)} + [D^k u]_{C^\alpha(\Omega)}$
$(L^p(\Omega), \\|\cdot\\|_{L^p(\Omega)})$	usual Lesbegue space
$(W^{k,p}(\Omega), \\|\cdot\\|_{W^{k,p}(\Omega)})$	usual Sobolev space
$W^{k,p}_{\mathrm{loc}}(\Omega)$	space of functions belonging to $W^{k,p}(\Omega')$ for every $\Omega' \subset\subset \Omega$
$W_0^{k,p}(\Omega)$	closure of $C_c^\infty(\Omega)$ in $W^{k,p}(\Omega)$
$W^{-m,p}(\Omega)$	dual space of $W_0^{m,p'}(\Omega)$ with $\frac{1}{p} + \frac{1}{p'} = 1$
$BV(\Omega)$	functions with bounded variation in Ω

Operators

$\mathcal{A}$	linear operator
$\mathcal{A}^*$	formal adjoint operator of $\mathcal{A}$
A	realization of $\mathcal{A}$ in a Banach space X
$D(A)$	the domain of A
$\rho(A)$	resolvent set of the linear operator A
$\sigma(A)$	spectrum of the linear operator A
I	identity operator
$[A, B]$	the operator $AB - BA$ defined in $D(AB) \cap D(BA)$

Measure theory and BV functions

$\mathcal{B}(X)$	σ- algebra of Borel subsets of a topological space X
$[\mathcal{M}(X)]^m$	the $\mathbf{R}^m$-valued finite Radon measures on X
$\mathcal{M}^+(X)$	the space of positive finite measures on X
$\mathcal{L}^n$	Lebesgue measure in $\mathbf{R}^n$
ω_n	Lebesgue measure of $B(0, 1)$ in $\mathbf{R}^n$
$\mathcal{H}^k$	k-dimensional Hausdorff measure
$\|E\|$ or $\mathcal{L}^n(E)$	the Lebesgue measure of the set E
$\|\mu\|$	total variation of the measure μ
$\mu \llcorner E$	restriction of the measure μ to the set E
Du	distributional derivative of u
$\mathcal{P}(E, \Omega)$	perimeter of E in Ω
$\mathcal{P}(E)$	perimeter of E in $\mathbf{R}^n$
ν_E	generalized inner normal to E
E^t	set of points of density t of E
$\mathcal{F}E, \partial^* E$	reduced and essential boundary of E