Notation and conventions

Below we list the notation and conventions used in this book. Most of them are standard.

Sets

$\mathbb{N}$	the set of natural numbers ($0 \notin \mathbb{N}$)
$\mathbb{Z}$	the set of integer numbers
$\mathbb{R}$	the set of real numbers
$\mathbb{C}$	the set of complex numbers
$(x_i)_{i \in I}$	a sequence indexed by I
$\coprod_{i \in I} X_i$	for a collection of sets $\{X_i \mid i \in I\}$, the disjoint sum of the sets X_i
$A \triangle B$	symmetric difference of A and B, i.e., $A \triangle B = (A \setminus B) \cup (B \setminus A)$
$\operatorname{supp} f$	the support of a function $f : X \to \mathbb{R}$, i.e., the set of those $x \in X$ for which $f(x) \neq 0$
$\operatorname{nbhd}_R(A)$	the R-neighborhood of a subset $A \subseteq X$ of a metric space X, $\operatorname{nbhd}_R(A) = \{x \in X \mid d(x, A) \leq R\}$
$\partial_r A$	the r-boundary of a subset $A \subseteq X$ of a metric space X, defined as $\{x \in X \setminus A \mid d(x, A) \leq r\}$
$\partial^e A$	the edge boundary of a set $A \subseteq V$ in a graph $X = (V, E)$, defined as the set of those edges $e \in E$, which have exactly one vertex in A

Numbers

$\# A$	the number of elements of a set A
$\lvert x \rvert$	the absolute value of $x \in \mathbb{R}$
$\lvert g \rvert$	in a group G, the length of an element $g \in G$
$\lfloor x \rfloor = \sup\{z \in \mathbb{Z} \mid x \geq z\}$	the floor function of $x \in \mathbb{R}$
$(x \mid y)_v$	the Gromov product of x and y with respect to p
$\langle v, w \rangle$	duality pairing of vectors

Groups

$e \in G$	the identity element in the group G
$\mathbb{F}_n$	the free group on n generators
$g \cdot f$	the translation action of $g \in G$ on a function $f : G \to X$, defined by $(g \cdot f)(h) = f(hg)$

Spaces

$B_X(x,r)$ or $B(x,r)$	the closed ball of radius r centered at $x \in X$, $B_X(x,R) = \{y \in X \mid d(x,y) \leq R\}$
$S_X(x,r)$ or $S(x,R)$	the sphere of radius r centered at $x \in X$, $S_X(x,R) = \{y \in X \mid d(x,y) = R\}$
$f(X)$	the image of the set X under a map f
$\ell_p(I) = \{(x_i)_{i \in I} \mid \sum_{i \in I} \lvert x_i \rvert^p < \infty\}$	the ℓ_p-space on I
$\ell_p(I)_{1,+}$	the set $\{f : I \to \mathbb{R} \mid f(i) \geq 0$ for all $i \in I$ and $\lVert f \rVert_p = 1\}$
$\left(\bigoplus X_n\right)_{(p)}$	the direct sum of Banach spaces X_n with the norm $\lVert (x_n) \rVert_p = (\sum_{i=1}^{\infty} \lVert x_n \rVert^p)^{1/p}$

Functions

1_A	the characteristic function of a set A
1_x	the Dirac function at x