Notation

Logic

$A \wedge B$	conjunction, A and B
$A \vee B$	disjunction, A or B
$\neg A$	negation, not A
$A \rightarrow B$	implication, A implies B
$A \leftrightarrow B$	equivalence, A if and only if B
$v[\![A]\!]$	a valuation v of the Boolean formula A
$A \equiv B$	logical equivalence, so $v[\![A]\!] = v[\![B]\!]$ for all valuations v
$\{P_1, \ldots, P_n\} \models A$	A is a logical consequence of the premises $P_1, \ldots, P_n$
$\{P_1, \ldots, P_n\} \vdash A$	A can be deduced from the premises $P_1, \ldots, P_n$
$\forall n\, P(n)$	the predicate $P(n)$ holds for all n in the universe
$\exists n\, P(n)$	the predicate $P(n)$ holds for some n in the universe

Sets

$\mathbf{N}_0$	the set of nonnegative integers $\{0, 1, 2, 3, \ldots\}$
$\mathbf{N}_1$	the set of positive integers $\{1, 2, 3, \ldots\}$
$\mathbf{Q}$	the set of rational numbers
$\mathbf{R}$	the set of real numbers
$\mathbf{Z}$	the set of integers
$\varnothing$	the empty set
$A \subseteq B$	A is a subset of the set B
$A \subsetneq B$	A is a proper subset of the set B
$A \cap B$	intersection of the sets A and B
$A \cup B$	union of the sets A and B
$A - B$	set of elements in A that are not in the set B, same as $A \setminus B$
$A \setminus B$	set of elements in A that are not in the set B, same as $A - B$
$A^{\complement}$	complement of A with respect to a universe U, so $A^{\complement} = U \setminus A$
$P(A)$	power set of A, the set of all subsets of A,
2^A	alternate notation for power sets, $2^A = P(A)$
$\lvert A \rvert$	cardinality of the set A

Functions

$f\colon A \to B$	function with domain A and codomain B
$\mathrm{dom}(f)$	domain of the function f
$\mathrm{ran}(f)$	range of the function, $\mathrm{ran}(f) = \{f(x) \mid x \in \mathrm{dom}(f)\}$
$f \upharpoonright X$	restriction of the function to X
f^{-1}	inverse of the function f or preimage of f
$f_{-1}(X)$	preimage of the set X, same as $f^{-1}(X)$ but unambiguous
$g \circ f$	composition of functions, $g \circ f(x) = g(f(x))$
i_A	identity map on a set A

Sums and Products

$\sum_{k=1}^{n} f(n)$	summation, $\sum_{k=1}^{n} f(n) = f(1) + f(2) + \cdots + f(n)$
Δ	difference operator
Δ^{-1}	summation operator
$\prod_{k=1}^{n} f(n)$	product, $\prod_{k=1}^{n} f(n) = f(1)f(2)\cdots f(n)$

Number Theory

$a \mid b$	integer a divides the integer b
$a \nmid b$	integer a does not divide the integer b
$a \equiv b \pmod{n}$	the integer $a - b$ is a multiple of n

Combinatorics

$k!$	factorial, $k! = 1 \cdot 2 \cdots (k-1) \cdot k$
$n^{\underline{k}}$	falling factorial power, $n^{\underline{k}} = n(n-1)\cdots(n-k+1)$
$n^{\overline{k}}$	rising factorial power, $n^{\overline{k}} = n(n+1)\cdots(n-k+1)$
$\binom{n}{k}$	binomial coefficient
$\binom{n}{k_1, k_2, \ldots, k_m}$	multinomial coefficient
$\left\{ {n \atop k} \right\}$	Stirling number of the second kind, also denoted as $S(n,k)$

Graph Theory

$V(G)$	vertex set of a graph G
$E(G)$	edge set of a graph G
$N(v)$	neighborhood of the vertex v
$N[v]$	closed neighborhood of the vertex v
$\deg v$	degree of the vertex v
$\delta(G)$	minimal degree of a graph G
$\Delta(G)$	maximal degree of a graph G
$d(u,v)$	distance between vertices u and v
$d(G)$	diameter of the graph G
$\alpha(G)$	independence number of G
$\chi(G)$	chromatic number of G
$\omega(G)$	clique number of G
$k(G)$	number of components of G
E_n	empty graph with n nodes
P_n	path graph with n nodes
C_n	cycle graph with n nodes
K_n	complete graph with n nodes
$K_{m,n}$	complete bipartite graph with $m+n$ nodes
Q_n	hypercube graph with 2^n nodes
$\overline{G}$	complementary graph of G
$G \,\square\, H$	Cartesian product of the graphs G and H

Probability Theory

$\Pr$	probability measure, sometimes denoted by μ
$\Pr[A]$	probability of event A
$\Pr[A \mid B]$	conditional probability of A given B
$\mathrm{E}[X]$	expected value of X
$\mathcal{B}(\mathbf{R})$	Borel σ-algebra
$\sigma(\mathcal{C})$	smallest σ-algebra generated by collection $\mathcal{C}$
$\sigma(X)$	σ-algebra generated by random variable X
$\liminf_{n\to\infty} E_n$	limit inferior event
$\limsup_{n\to\infty} E_n$	limit superior event
$\lim_{n\to\infty} E_n$	limit event