

Notation Reference

Core Probability

Notation	Meaning
E	Capital letters can denote events
A	Sometimes they denote sets
$ E $	Size of an event or set
E^C	Complement of an event or set
EF	And of events (aka intersection)
$E \text{ and } F$	And of events (aka intersection)
$E \cap F$	And of events (aka intersection)
$E \text{ or } F$	Or of events (aka union)
$E \cup F$	Or of events (aka union)
$\text{count}(E)$	The number of times that E occurs
$P(E)$	The probability of an event E
$P(E F)$	The conditional probability of an event E given F
$P(E, F)$	The probability of event E and F
$P(E F, G)$	The conditional probability of an event E given both F and G
$n!$	n factorial
$\binom{n}{k}$	Binomial coefficient
$\binom{n}{r_1, r_2, r_3}$	Multinomial coefficient

Random Variables

Notation	Meaning
x	Lower case letters denote regular variables
X	Capital letters are used to denote random variables
K	Capital K is reserved for constants
$E[X]$	Expectation of X
$\text{Var}(X)$	Variance of X

Notation	Meaning
$P(X = x)$	Probability mass function (PMF) of X , evaluated at x
$P(x)$	Probability mass function (PMF) of X , evaluated at x
$f(X = x)$	Probability density function (PDF) of X , evaluated at x
$f(x)$	Probability density function (PDF) of X , evaluated at x
$f(X = x, Y = y)$	Joint probability density
$f(X = x Y = y)$	Conditional probability density
$F_X(x)$ or $F(x)$	Cumulative distribution function (CDF) of X
IID	Independent and Identically Distributed

Parametric Distributions

Notation	Meaning
$X \sim \text{Bern}(p)$	X is a Bernoulli random variable
$X \sim \text{Bin}(n, p)$	X is a Binomial random variable
$X \sim \text{Poi}(p)$	X is a Poisson random variable
$X \sim \text{Geo}(p)$	X is a Geometric random variable
$X \sim \text{NegBin}(r, p)$	X is a Negative Binomial random variable
$X \sim \text{Uni}(a, b)$	X is a Uniform random variable
$X \sim \text{Exp}(\lambda)$	X is a Exponential random variable
$X \sim \text{Beta}(a, b)$	X is a Beta random variable