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CS109

Handout #25
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Probability Notation

This handout maps between math notation used in CS109 and English. Note: "or" is not notation.

Events and Sets

E or F	Capital letters can denote events
A or B	Sometimes they denote sets
$\|E\|$ or $\|A\|$	Size of an event or set
E^C or A^C	Complement of an event or set
EF or AB	Intersection of events or sets
$E \cup F$ or $A \cup B$	Union of events or sets
$P(E)$	The probability of an event E
$P(E\|F)$	The conditional probability of an event E given F
$\binom{n}{m}$	Binomial coefficient
$\binom{n}{a,b,c}$	Multinomial coefficient

Random Variables

x or y or i	Lower case letters often denote regular variables
X or Y	Capital letters are used to denote random variables
$E[X]$	Expectation of X
$Var(X)$	Variance of X
$p_X(x)$	Probability mass function (PMF) of X
$p_{X,Y}(x,y)$	Joint probability mass function (PMF) of X and Y
$p_{X\|Y}(x\|y)$	Conditional probability mass function (PMF) of X given Y
$f_X(x)$	Probability density function (PDF) of X
$f_{X,Y}(x,y)$	Joint probability density function (PDF) of X and Y
$f_{X\|Y}(x\|y)$	Conditional probability density function (PDF) of X given Y
$F_X(x)$	Cumulative distribution function (CDF) of X
$F_{X,Y}(x,y)$	Joint cumulative distribution function (CDF) of X and Y
$F_{X\|Y}(x\|y)$	Conditional cumulative distribution function (CDF) of X given Y
$X \sim Ber(p)$	X is a Bernoulli random variable with parameter p
$X \sim Bin(n,p)$	X is a Binomial random variable with parameters n,p
$X \sim Poi(\lambda)$	X is a Poisson random variable with parameter λ
$X \sim Geo(p)$	X is a Geometric random variable with parameter p
$X \sim NegBin(r,p)$	X is a Negative Binomial random variable with parameters r,p
$X \sim HypGeo(n,N,m)$	X is a Hyper Geometric random variable with parameters n,N,m
$X \sim N(\mu,\sigma^2)$	X is a Gaussian random variable with mean μ and variance σ^2
$X \sim Uni(a,b)$	X is a Uniform random variable with parameters a,b
$X \sim Exp(\lambda)$	X is a Exponential random variable with parameter λ
$X \sim Beta(a,b)$	X is a Beta random variable with parameters a,b