Summary of Discrete Distributions

Notation and Parameters	**Probability Function** $f(x)$	**Mean** $E(X)$	**Variance** $Var(X)$
Discrete Uniform(a, b) $b \geq a$ a, b integers	$\frac{1}{b-a+1}$ $x = a, a+1, \dots, b$	$\frac{a+b}{2}$	$\frac{(b-a+1)^2-1}{12}$
Hypergeometric(N, r, n) $N = 1,2, \dots$ $n = 0,1, \dots, N$ $r = 0,1, \dots, N$	$\frac{\binom{r}{x}\binom{N-r}{n-x}}{\binom{N}{n}}$ $x = max(0, n-N+r), \dots, min(r, n)$	$\frac{nr}{N}$	$\frac{nr}{N}\left(1-\frac{r}{N}\right)\frac{N-n}{N-1}$
Binomial(n, p) $0 \leq p \leq 1, q = 1-p$ $n = 1,2, \dots$	$\binom{n}{x}p^x q^{n-x}$ $x = 0,1, \dots, n$	np	npq
Bernoulli(p) $0 \leq p \leq 1, q = 1-p$	$p^x q^{1-x}$ $x = 0,1$	p	pq
Negative Binomial(k, p) $0 < p \leq 1, q = 1-p$ $k = 1,2, \dots$	$\binom{x+k-1}{x}p^k q^x$ $= \binom{-k}{x}p^k(-q)^x$ $x = 0,1, \dots$	$\frac{kq}{p}$	$\frac{kq}{p^2}$
Geometric(p) $0 < p \leq 1, q = 1-p$	pq^x $x = 0,1, \dots$	$\frac{q}{p}$	$\frac{q}{p^2}$
Poisson(λ) $\lambda \geq 0$	$\frac{e^{-\lambda}\lambda^x}{x!}$ $x = 0,1, \dots$	λ	λ

Summary of Continuous Distributions

Notation and Parameters	**Probability Density Function** $f(x)$	**Mean** $E(X)$	**Variance** $Var(X)$
Uniform(a, b) $b > a$	$\frac{1}{b-a}$ $a \leq x \leq b$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$
Exponential(θ) $\theta > 0$	$\frac{1}{\theta} e^{-x/\theta}$ $x \geq 0$	θ	θ^2