Table of Distributions

Distribution	Notation	Probability Function	Mean	Variance	Moment-Generating Function
		Discrete Distributions			
Binomial	$\mathrm{Bin}(n,p)$	$p_X(k)=\binom{n}{k}p^k(1-p)^{n-k},\ k=0,1,\ldots,n$	np	$np(1-p)$	$\left[pe^t+(1-p)\right]^n$
Geometric	$\mathrm{Geom}(p)$	$p_X(k)=p(1-p)^{k-1},\ k=1,2,\ldots$	$\frac{1}{p}$	$\frac{1-p}{p^2}$	$\dfrac{pe^t}{1-(1-p)e^t}$
Negative Binomial	$\mathrm{NegBin}(r,p)$	$p_X(k)=\binom{k-1}{r-1}p^r(1-p)^{k-r},\ k=r,r+1,\ldots$	$\frac{r}{p}$	$\frac{r(1-p)}{p^2}$	$\left[\dfrac{pe^t}{1-(1-p)e^t}\right]^r$
HyperGeometric	$\mathrm{Hyp}(N,r,n)$	$p_X(k)=\dfrac{\binom{r}{k}\binom{N-r}{n-k}}{\binom{N}{n}},\ k=0,1,\ldots,\min(n,r)$	$\frac{nr}{N}$	$\left(\frac{nr}{N}\right)\left(\frac{N-r}{N}\right)\left(\frac{N-n}{N-1}\right)$	
Poisson	$\mathrm{Pois}(\lambda)$	$p_X(k)=e^{-\lambda}\dfrac{\lambda^k}{k!},\ k=0,1,2,\ldots$	λ	λ	$\exp\left\{\lambda\left(e^t-1\right)\right\}$
		Continuous Distributions			
Uniform	$\mathrm{U}(a,b)$	$f_X(x)=\dfrac{1}{b-a},\ a<x<b$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\dfrac{e^{tb}-e^{ta}}{t(b-a)}$
Normal	$\mathcal{N}(\mu,\sigma^2)$	$f_X(x)=\dfrac{1}{\sqrt{2\pi}\sigma}\exp\left[-\dfrac{(x-\mu)^2}{2\sigma^2}\right],\ -\infty<x<\infty$	μ	σ^2	$\exp\left(\mu t+\dfrac{t^2\sigma^2}{2}\right)$
Exponential	$\mathrm{Exp}(\beta)$	$f_X(x)=\dfrac{1}{\beta}\exp\left(-x/\beta\right),\ x>0$	β	β^2	$(1-t\beta)^{-1},\ t<1/\beta$
Gamma	$\mathrm{G}(\alpha,\beta)$	$f_X(x)=\dfrac{1}{\Gamma(\alpha)\beta^\alpha}x^{\alpha-1}e^{-x/\beta},\ x>0$	$\alpha\beta$	$\alpha\beta^2$	$(1-t\beta)^{-\alpha},\ t<1/\beta$
Chi-Squared	χ^2_ν	$f_X(x)=\dfrac{1}{\Gamma(\nu/2)2^{\nu/2}}x^{\frac{\nu}{2}-1}e^{-\frac{x}{2}},\ x>0$	ν	2ν	$(1-2t)^{-\nu/2},\ t<1/2$
Beta	$\mathrm{Beta}(\alpha,\beta)$	$f_X(x)=\dfrac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)}x^{\alpha-1}(1-x)^{\beta-1},\ 0<x<1$	$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$	does not exist