Distribution	*Parameters*	*Support*	*pmf/pdf*	*cdf*	*Mean*	*Variance*	*MGF*
Bernoulli	θ	$\{0,1\}$	$\theta^y(1-\theta)^{1-y}$		θ	$\theta(1-\theta)$	$(1-\theta)+\theta e^t$
Binomial	θ, N	$\mathbb{Z}_+$	$\binom{N}{y}\theta^y(1-\theta)^{N-y}$		$N\theta$	$N\theta(1-\theta)$	$(1-\theta+\theta e^t)^N$
Geometric	θ	$\mathbb{N}$	$(1-\theta)^{y-1}\theta$		$\frac{1}{\theta}$	$\frac{1-\theta}{\theta^2}$	$\frac{\theta e^t}{1-(1-\theta)e^t}$
Poisson	λ	$\mathbb{Z}_+$	$\frac{\lambda^y e^{-\lambda}}{y!}$		λ	λ	$e^{\lambda(e^t-1)}$
Log Series	θ	$\mathbb{N}$	$\frac{-\theta^y}{y\log 1-\theta}$		$\frac{-\theta}{\log 1-\theta(1-\theta)}$	$\frac{-\theta}{\log 1-\theta(1-\theta)^2}\left[1-\frac{-\theta}{\log 1-\theta}\right]$	$\frac{\log 1-\theta e^t}{\log 1-\theta}$
Multinomial	$N, \theta_1 ... \theta_k$	$\{0,1,...,n\}$ where $\sum x_i = N$	$\frac{n!}{x_1!...x_k!}\theta_1^{x_1}...\theta_k^{x_k}$		$N\theta_i$	$n\theta_i(1-\theta_i)$	$(\sum_{n=1}^N \theta_n e^{t_n})^N$
Uniform	a, b	$x \subset \mathbb{R}, x \in [a,b]$	$\frac{1}{b-a}$	$\frac{x-a}{b-a}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{tb}-e^{ta}}{t(b-a)}$
Exponential	λ	$\mathbb{R}_+$	$\lambda e^{-\lambda y}$	$1-e^{-\lambda y}$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$	$\frac{\lambda}{\lambda-t}$
Gamma	α, β	$\mathbb{R}_{++}$	$\frac{\beta^\alpha}{\Gamma(\alpha)}y^{\alpha-1}e^{-\beta y}$	$\frac{1}{\Gamma(\alpha)}\gamma(\alpha, \beta y)$	$\frac{\alpha}{\beta}$	$\frac{\alpha}{\beta^2}$	$(1-\frac{t}{\beta})^{-\alpha}$
Chi-Squared	k	$\mathbb{R}_+$	$\frac{1}{2^{\frac{k}{2}}\Gamma(\frac{k}{2})}y^{\frac{k}{2}-1}e^{\frac{-y}{2}}$	$\frac{1}{\Gamma(\frac{k}{2})}\gamma(\frac{k}{2}, \frac{y}{2})$	k	$2k$	$(1-2t)^{\frac{-k}{2}}$
Normal Distribution	μ, σ^2	$\mathbb{R}$	$\frac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$		μ	σ^2	$e^{\mu t+\frac{1}{2}\sigma^2 t^2}$
Weibull	λ, k	$\mathbb{R}_+$	$\frac{k}{\lambda}(\frac{x}{\lambda})^{k-1}e^{-(\frac{x}{\lambda})^k}$	$1-e^{-(\frac{x}{\lambda})^k}$	$\lambda\Gamma(1+\frac{1}{k})$	$\lambda^2\left[\Gamma(1+\frac{2}{k})-(\Gamma(1+\frac{1}{k}))^2\right]$	$\sum_{n=0}^{\infty}\frac{t^n\lambda^n}{n!}\Gamma(1+\frac{n}{k})$
F	d_1, d_2	$\mathbb{R}_+$	$\frac{\sqrt{\frac{(d_1 y)^{d_1} d_2^{d_2}}{(d_1 y+d_2)^{d_1+d_2}}}}{yB(\frac{d_1}{2}, \frac{d_2}{2})}$		$\frac{d_2}{d_2-2}$	$\frac{2d_2^2(d_1+d_2-2)}{d_1(d_2-2)^2(d_2-4)}$	Undefined
Students t	v	$\mathbb{R}$	$\frac{\Gamma(\frac{v+1}{2})}{\sqrt{v\pi}\Gamma(\frac{v}{2})}(1+\frac{y^2}{v})^{-\frac{v+1}{2}}$		0	$\frac{v}{v-2}$	Undefined
Dirichelet	$K, \alpha_1, ..., \alpha_K$	$x_i \in (0,1)\sum_{i=1}^K x_i = 1$	$\frac{\Gamma(\sum_{i=1}^K \alpha_i)}{\Pi_{i=1}^K \Gamma(\alpha_i)}\Pi_{i=1}^K x_i^{\alpha_i-1}$		$\frac{\alpha_i}{\sum \alpha_i}$	$\frac{\alpha_i(\alpha_0-\alpha_i)}{\alpha_0^2(\alpha_0+1)}$ where $\alpha_0 = \sum \alpha_i$	
MultiVariate Normal	$\boldsymbol{\mu\Sigma}$	$\mu + \text{span}(\boldsymbol{\Sigma})$	$(det(2\pi\boldsymbol{\Sigma})^{\frac{-1}{2}}e^{\frac{-1}{2}(x-\boldsymbol{\mu})^T\boldsymbol{\Sigma}^{-1}(x-\boldsymbol{\mu})}$		$\boldsymbol{\mu}$	$\boldsymbol{\Sigma}$	$e^{\boldsymbol{\mu}^T\boldsymbol{t}+\frac{1}{2}\boldsymbol{t}^T\boldsymbol{\Sigma t}}$
Pareto Distribution	x_m, α	$[x_m, \infty)$	$\frac{\alpha x_m^\alpha}{x^{\alpha+1}}$	$1-\frac{x_m}{x}^\alpha$	$\frac{\alpha x_m}{\alpha-1}$	$\frac{x_m^2}{(\alpha-1)^2(\alpha-2)}$	$\alpha(-x_m t)^\alpha\Gamma(-\alpha, -x_m t)$