Distribuciones Continuas

Nombre de la distribución	Función de distribución de probabilidad (Función de Densidad)	Tipo de parámetro	Media $E[X]$	Varianza $E[(X-E[X])^2]$	Generadora de momentos $m_X(t)=E[e^{tX}]$
Uniforme	$f_X(x)=\frac{1}{b-a} \quad a\le x\le b$ $-\infty<a<b<\infty$	a : *localización (límite inferior)* b : *localización (límite superior)*	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{bt}-e^{at}}{(b-a)t}$
Normal	$f_X(x)=\frac{1}{\sigma\sqrt{2\pi}}\exp\left[-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2\right]$ $-\infty<x<\infty \quad -\infty<\mu<\infty \quad \sigma>0$	μ : *localización (central)* σ : *escala*	μ	σ^2	$e^{\mu t+\frac{t^2\sigma^2}{2}}$
Lognormal	$f_X(x)=\frac{1}{x\sqrt{2\pi}\sigma}e^{-\frac{1}{2}\left(\frac{\ln x-\mu}{\sigma}\right)^2}$ $o<x<\infty \quad -\infty<\mu<\infty \quad \sigma>0$	μ : *escala (log-localización)* σ : *forma (log-escala)*	$e^{\mu+\frac{1}{2}\sigma^2}$	$e^{2\mu+2\sigma^2}-e^{2\mu+\sigma^2}$	No está definida
Exponencial	$f_X(x)=\lambda e^{-\lambda x} \quad 0<x<\infty \quad \lambda>0$	λ : *tasa* $\lambda=\frac{1}{\theta}$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$	$\frac{\lambda}{\lambda-t} \quad t<\lambda$
	$f_X(x)=\frac{1}{\theta}e^{\frac{-x}{\theta}} \quad 0<x<\infty \quad \theta>0$	θ : *escala*	θ	θ^2	$\frac{1}{1-t\theta} \quad t<\frac{1}{\theta}$
Gamma	$f_X(x)=\frac{\lambda^\beta}{\Gamma(\beta)}x^{\beta-1}e^{-\lambda x}$ $0<x<\infty \quad \lambda>0 \quad \beta>0$	λ : *tasa* β : *forma* $\lambda=\frac{1}{\theta}$	$\frac{\beta}{\lambda}$	$\frac{\beta}{\lambda^2}$	$\left[\frac{\lambda}{\lambda-t}\right]^\beta \quad t<\lambda$
	$f_X(x)=\frac{1}{\theta^\beta\Gamma(\beta)}x^{\beta-1}e^{\frac{-x}{\theta}}$ $0<x<\infty \quad \theta>0 \quad \beta>0$	θ : *escala* β : *forma*	$\beta\theta$	$\beta\theta^2$	$\left[\frac{1}{1-t\theta}\right]^\beta \quad t<\frac{1}{\theta}$

Weibull	$f_X(x)=\beta\alpha^{\beta}x^{\beta-1}e^{-(\alpha x)^{\beta}}$ $0<x<\infty \quad \alpha>0 \quad \beta>0$	$\alpha: tasa$ $\beta: forma$ $\alpha=\frac{1}{\theta}$	$\frac{1}{\alpha}\Gamma\left(1+\frac{1}{\beta}\right)$	$\frac{1}{\alpha^2}\left[\Gamma\left(1+\frac{2}{\beta}\right)-\Gamma\left(1+\frac{1}{\beta}\right)^2\right]$	$\sum_{k=0}^{\infty}\frac{t^k}{k!\alpha^k}\Gamma\left(1+\frac{1}{\beta}\right) \quad \beta\geq 1$
	$f_X(x)=\frac{\beta}{\theta}\left(\frac{x}{\theta}\right)^{\beta-1}e^{-\left(\frac{x}{\theta}\right)^{\beta}}$ $0<x<\infty \quad \theta>0 \quad \beta>0$	$\theta: escala$ $\beta: forma$	$\theta\Gamma\left(1+\frac{1}{\beta}\right)$	$\theta^2\left[\Gamma\left(1+\frac{2}{\beta}\right)-\Gamma\left(1+\frac{1}{\beta}\right)^2\right]$	$\sum_{k=0}^{\infty}\frac{t^k\theta^k}{k!}\Gamma\left(1+\frac{1}{\beta}\right) \quad \beta\geq 1$
Beta	$f_X(x)=\frac{1}{B(\alpha,\beta)}x^{\alpha-1}(1-x)^{\beta-1}$ $0<x<1 \quad \alpha>0 \quad \beta>0$	$\alpha: forma$ $\beta: forma$	$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta+1)(\alpha+\beta)^2}$	$1+\sum_{k=1}^{\infty}\left(\prod_{h=0}^{k-1}\frac{\alpha+h}{\alpha+\beta+h}\right)\frac{t^k}{k!}$
Ji-cuadrada	$f_X(x)=\frac{1}{2^{\frac{\nu}{2}}\Gamma(\frac{\nu}{2})}x^{\frac{\nu}{2}-1}e^{-\frac{x}{2}}$ $0<x<\infty \quad \nu=1,2,\ldots$	$\nu: grados \quad de \quad libertad$	ν	2ν	$\left[\frac{1}{1-2t}\right]^{\frac{\nu}{2}} \quad 2t<1$
t-Student	$f_X(x)=\frac{\Gamma(\frac{\nu+1}{2})}{\sqrt{\nu\pi}\Gamma(\frac{\nu}{2})}\left(1+\frac{x^2}{\nu}\right)^{-\frac{\nu+1}{2}}$ $-\infty<x<\infty \quad \nu=1,2,\ldots$	$\nu: grados \quad de \quad libertad$	0 $\nu>1$	$\frac{\nu}{\nu-2} \quad \nu>2$	No está definida
Fisher	$f_X(x)=\frac{\sqrt{\frac{(x\nu)^{\nu}\eta^{\eta}}{(x\nu+\eta)^{\nu+\eta}}}}{x\mathrm{B}\left(\frac{\nu}{2},\frac{\eta}{2}\right)}$ $0<x<\infty \quad \nu=1,2,\ldots \quad \eta=1,2,\ldots$	$\nu: grados \quad de \quad libertad \quad del \quad numerador$ $\eta: grados \quad de \quad libertad \quad del \quad denominador$	$\frac{\eta}{\eta-2}$ $\eta>2$	$\frac{2\eta^2(\nu+\eta-2)}{\nu(\eta-2)^2(\eta-4)}$ $\eta>4$	No está definida
Cauchy	$f_X(x)=\frac{1}{\pi\theta\left[1+\left(\frac{x-\mu}{\theta}\right)^2\right]}$ $-\infty<x<\infty \quad -\infty<\mu<\infty \quad \theta>0$	$\mu: localización \ (central)$ $\theta: escala$	No está definida	No está definida	No está definida

Función gamma

$$\Gamma(z) = \int_0^\infty t^{z-1} e^{-t} dt, \quad z > 0$$

$$\Gamma(z) = (z-1)\Gamma(z-1)$$

$$\Gamma(z) = (z-1)!, \quad z : entero > 0$$

$$\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$$

Función beta

$$\mathrm{B}(x,y) = \int_0^1 t^{x-1}(1-t)^{y-1} dt, \quad x, y > 0$$

$$\mathrm{B}(x,y) = \mathrm{B}(y,x)$$

$$\mathrm{B}(x,y) = \frac{\Gamma(x)\Gamma(y)}{\Gamma(x+y)}$$