DISTRIBUCIONES CONTINUAS

NOMBRE	MOMENTO	ESPERANZA	VARIANZA
UNIFORME CONTINUA $X \simeq U(a,b)$	$* f(x) = \frac{1}{b-a} \ \forall x \in [a,b]$	$\mu = \int_a^b \frac{x}{b-a} = \frac{b+a}{2}$	$\alpha_2 = E(X^2) = \int_a^b \frac{x^2}{b-a} = \frac{b^3-a^3}{3(b-a)}$ $\sigma^2 = \frac{(b-a)^2}{12}$
GAMMA $X \simeq \Gamma(p,a)$	$M(t) = E(e^{tx}) = \frac{a^p}{\Gamma p}\int_0^\infty e^{tx} x^{p-1} e^{-ax} dx =$ $= \frac{a^p}{\Gamma(p)}\int_0^\infty x^{p-1} e^{-ax(1-t/a)} dx = [\ ]$ $= (1-\frac{t}{a})^{-p} = (\frac{a}{a-t})^p$ $\psi(t) = (1-\frac{it}{a})^{-p}$	$\mu = \alpha_1 = M'(0) = \frac{p}{a}$	$\alpha_2 = M''(0) = \frac{p(p+1)}{a^2}$ $\sigma^2 = \alpha_2 - \mu^2 = \frac{p(p+1-p)}{a^2} =$ $= \frac{p}{a^2}$
EXPONENCIAL $X \simeq Exp(a)$ $X \simeq \Gamma(1,a)$	$M(t) = \frac{a}{a-t}$ $t > a$ $\psi(t) = (1-\frac{it}{a})^{-1}$ $t \in \mathbb{R}$	$\mu = \alpha_1 = M''(0) = \frac{1}{a}$	$\alpha_2 = M''(0) = \frac{2}{a^2}$ $\sigma^2 = \alpha_2 - \mu^2 = \frac{1}{a^2}$
CHI-CUADRADO $X \simeq \chi^2(n)$ $X \simeq \Gamma(\frac{n}{2}, \frac{1}{2})$	$M(t) = (1-2t)^{-n/2}$ $\psi(t) = (1-2it)^{-\frac{n}{2}}$	$\mu = n$	$\sigma^2 = 2n$
BETA $X \simeq Beta(p,q)$	$\alpha_k = \frac{\Gamma(p+q)}{\Gamma(p)\Gamma(q)}\int_0^1 x^{k+p-1}(1-x)^{q-1} dx =$ $= \frac{\beta(p+k,q)}{\beta(p,q)}$	$\alpha_1 = \frac{p}{p+q} = \mu$	$\alpha_2 = \frac{p(p+1)}{(p+q)(p+q+1)}$ $\sigma^2 = \frac{pq}{(p+q)^2(p+q+1)}$
NORMAL TIPIFICADA $X \simeq N(0,1)$	$M(t) = e^{\frac{t^2}{2}}$ $\psi(t) = e^{-\frac{t^2}{2}}$	$\mu = \alpha_1 = M'(0) = t e^{\frac{t^2}{2}}\Big]_0 = 0$	$\sigma^2 = \alpha_2 - \mu^2 = M''(0) =$ $= e^{\frac{t^2}{2}} + t^2 e^{\frac{t^2}{2}}\Big]_0 = 1$
NORMAL $X \simeq N(\mu,\sigma)$	$Y = \sigma X + \mu$	$\mu = E(Y) = \sigma \cdot E(X) + E(\mu) = \mu$	$V(Y) = \sigma^2 V(X) = \sigma^2$
T-STUDENT		$\mu = 0$	$\sigma^2 = \frac{n}{n-2}$
F de FISHER SNEDECOR		$\mu = \frac{n}{n-2}$ $n > 2$	$\sigma^2 = \frac{2n^2(m+n-2)}{m(n-2)(n-4)}$ $n > 4$

DISTRIBUCIONES DISCRETAS

NOMBRE	FUNCIÓN CARACTERÍSTICA	MOMENTO	ESPERANZA	VARIANZA
SINGULAR $f(x)=1$ si $x=a$	$\psi(t)=\sum_x e^{itx} f(x)=e^{ita}$	$M(t)=\sum_x e^{tx} f(x)=$ $=e^{ta}$	$\mu=\alpha_1=M'(0)=a$	$\alpha_2=M''(0)=a^2$ $\sigma^2=\alpha_2-\mu^2=0$
UNIFORME $f(x_j)=\frac{1}{K}$ $X \simeq U(a,b)$	$\psi(t)=\sum_{j=1}^{K} e^{itx_j} f(x_j)=\frac{1}{K}\sum_{j=1}^{K} e^{itx_j}$	$M(t)=\sum_{j=1}^{K} e^{tx_j} f(x)=$ $=\frac{1}{K}\sum_{j=1}^{K} e^{tx_j}$	$\mu=\alpha_1=M'(0)=$ $=\frac{1}{K}\sum_{j=1}^{K} x_j=\bar{x}$	$\alpha_2=M''(0)=$ $1/K\sum_{j=1}^{K} x_j^2$ $\sigma^2=\alpha_2-\mu^2=$ $\frac{1}{K}\sum_{j=1}^{K}(x_j-\bar{x})^2$
BERNOULLI $f(x)=p^x q^{1-x}$ $X \simeq B(1,p)$	$\psi(t)=\sum_{x=0,1} e^{itx} f(x)=f(0)+$ $e^{it} f(1)=q+p\,e^{it}$	$M(t)=\sum_{x=0,1} e^{tx} f(x)=$ $f(0)+e^{t} f(1)=$ $q+p\cdot e^{t}$	$\mu=\alpha_1=M'(0)=p$	$\alpha_2=M''(0)=p$ $\sigma^2=\alpha_2-\mu^2=$ $p-p^2=p(1-p)$
BINOMIAL $X \simeq B(n,p)$	$\mu=E(X)=E\left(\sum_{i=1}^{n} X_i\right)=\sum_{i=1}^{n} E(X_i)=np$ $\sigma^2=V(X)=V\left(\sum_{i=1}^{n} X_i\right)=\sum_{i=1}^{n} V(X_i)=npq$			
POISSON $X \simeq P(\lambda)$ $P(\lambda)=e^{-\lambda}\frac{\lambda^x}{x!}$	$M(t)=E(e^{tx})=\sum_x e^{tx} f(x)=\sum_x e^{tx} e^{-\lambda}\frac{\lambda^x}{x!}=$ $=e^{-\lambda}\sum_x \frac{(\lambda e^t)^x}{x!}=e^{-\lambda}\cdot e^{\lambda e^t}=e^{\lambda(e^t-1)}$		$\mu=\alpha_1=M'(0)=\lambda$	$\alpha_2=M''(0)=\lambda+\lambda^2$ $\sigma^2=\alpha_2-\mu^2=\lambda$
GEOMÉTRICA $f(x)=(1-p)^{x-1}\cdot p$	$M(t)=E(e^{tx})=\sum_x e^{tx} f(x)=\sum_{x=1}^{\infty} e^{tx} q^{x-1}\cdot p=$ $pe^t(1+qe^t+\dots)=pe^t\frac{1}{1-qe^t}$		$\mu=M'(0)=\frac{1}{p}$	$\sigma^2=M''(0)-\mu^2=$ $\frac{q}{p^2}$
BINOMIAL NEGATIVA	$M(t)=\left(\frac{pe^t}{1-qe^t}\right)^K \quad t<\ln(1/q)$		$\mu=\frac{K(1-p)}{p}$	$\sigma^2=\frac{K(1-p)}{p^2}$
HIPERGEOMÉTRICA $X \simeq HG(n,a,b)$	$*\ P(X=x)=\frac{\binom{a}{x}\binom{b}{n-x}}{\binom{a+b}{n}}$ $\quad x=\langle 0,n\rangle$ $x\le a,\ n-x\le b$		$\mu=np$	$\sigma^2=npq\,\frac{n-a}{n-1}$