# tabla_densidades

November 25, 2025

| Distribución / Notación | Tipo | Parámetros | Soporte de $X$ | PMF $p_X(x)$ | $\mathbb{E}[X]$ | $\mathrm{Var}(X)$ | FGM $M_X(t)$ (si es simple) |
|---|---|---|---|---|---|---|---|
| Uniforme discreta ($X \sim \mathrm{Unif}\{1,\dots,n\}$) | Discreta | $n \in \mathbb{N},\ n \geq 1$ | $\{1,2,\dots,n\}$ | $p_X(k) = \dfrac{1}{n},\ k = 1,\dots,n$ | $\dfrac{n+1}{2}$ | $\dfrac{n^2-1}{12}$ | $M_X(t) = \dfrac{1}{n}\sum_{k=1}^{n} e^{tk}$ |
| Bernoulli ($X \sim \mathrm{Bern}(p)$) | Discreta | $0 \leq p \leq 1$ | $\{0,1\}$ | $p_X(1) = p,\ p_X(0) = 1-p$ | $p$ | $p(1-p)$ | $M_X(t) = (1-p) + pe^t$ |
| Binomial ($X \sim \mathrm{Bin}(n,p)$) | Discreta | $n \in \mathbb{N},\ 0 \leq p \leq 1$ | $\{0,1,\dots,n\}$ | $p_X(k) = \binom{n}{k}p^k(1-p)^{n-k}$ | $np$ | $np(1-p)$ | $M_X(t) = (1-p+pe^t)^n$ |
| Hipergeométrica ($X \sim \mathrm{Hiper}(N,K,n)$) | Discreta | $N \in \mathbb{N},\ K \in \{0,\dots,N\},\ n \in \{0,\dots,N\}$ | $k$ tal que $\max(0,\ n-(N-K)) \leq k \leq \min(n,K)$ | $p_X(k) = \dfrac{\binom{K}{k}\binom{N-K}{n-k}}{\binom{N}{n}}$ | $n\frac{K}{N}$ | $n\frac{K}{N}\left(1-\frac{K}{N}\right)\frac{N-n}{N-1}$ | No tiene una forma cerrada tan simple |
| Poisson ($X \sim \mathrm{Pois}(\lambda)$) | Discreta | $\lambda > 0$ | $\{0,1,2,\dots\}$ | $p_X(k) = \dfrac{\lambda^k e^{-\lambda}}{k!}$ | $\lambda$ | $\lambda$ | $M_X(t) = \exp\left(\lambda(e^t-1)\right)$ |
| Binomial negativa ($X \sim \mathrm{NB}(r,p)$) | Discreta | $r > 0$ (habitualmente $r \in \mathbb{N}$), $0 < p < 1$ | $\{0,1,2,\dots\}$ (número de fallos antes del $r$-ésimo éxito) | $p_X(k) = \binom{k+r-1}{k}(1-p)^k p^r$ | $\dfrac{r(1-p)}{p}$ | $\dfrac{r(1-p)}{p^2}$ | $M_X(t) = \left(\dfrac{p}{1-(1-p)e^t}\right)^r,\ t < -\ln(1-p)$ (dominio donde converja) |

| Distribución / Notación | Tipo | Parámetros | Soporte de $X$ | PDF $f_X(x)$ | $\mathbb{E}[X]$ | $\mathrm{Var}(X)$ | FGM $M_X(t)$ (si es simple) |
|---|---|---|---|---|---|---|---|
| Uniforme continua ($X \sim \mathrm{Unif}(a,b)$) | Continua | $a < b$ | $(a,b)$ | $f_X(x) = \dfrac{1}{b-a}$ para $a < x < b$; 0 en otro caso | $\dfrac{a+b}{2}$ | $\dfrac{(b-a)^2}{12}$ | $M_X(t) = \dfrac{e^{tb}-e^{ta}}{t(b-a)}$, $t \neq 0$; $M_X(0) = 1$ |
| Normal ($X \sim \mathcal{N}(\mu,\sigma^2)$) | Continua | $\mu \in \mathbb{R},\ \sigma > 0$ | $\mathbb{R}$ | $f_X(x) = \dfrac{1}{\sigma\sqrt{2\pi}}\exp\left(-\dfrac{(x-\mu)^2}{2\sigma^2}\right)$ | $\mu$ | $\sigma^2$ | $M_X(t) = \exp(\mu t + \frac{1}{2}\sigma^2 t^2)$ |
| Gamma ($X \sim \Gamma(k,\theta)$) (shape-scale) | Continua | $k > 0$ (forma), $\theta > 0$ (escala) | $(0,\infty)$ | $f_X(x) = \dfrac{1}{\Gamma(k)\theta^k}x^{k-1}e^{-x/\theta}$, $x > 0$ | $k\theta$ | $k\theta^2$ | $M_X(t) = (1-\theta t)^{-k}$, para $t < 1/\theta$ |
| Exponencial ($X \sim \mathrm{Exp}(\lambda)$) | Continua | $\lambda > 0$ (tasa) | $[0,\infty)$ | $f_X(x) = \lambda e^{-\lambda x}$, $x \geq 0$ | $\dfrac{1}{\lambda}$ | $\dfrac{1}{\lambda^2}$ | $M_X(t) = \dfrac{\lambda}{\lambda-t}$, $t < \lambda$ |
| Chi-cuadrado ($X \sim \chi^2_\nu$) | Continua | $\nu > 0$ (grados de libertad) | $[0,\infty)$ | $f_X(x) = \dfrac{1}{2^{\nu/2}\Gamma(\nu/2)}x^{\nu/2-1}e^{-x/2}$, $x > 0$ | $\nu$ | $2\nu$ | $M_X(t) = (1-2t)^{-u/2}$, $t < \frac{1}{2}$ |
| t de Student ($X \sim t_\nu$) | Continua | $\nu > 0$ (grados de libertad) | $\mathbb{R}$ | $f_X(x) = \dfrac{\Gamma(\frac{\nu+1}{2})}{\sqrt{\nu\pi}\,\Gamma(\frac{\nu}{2})}\left(1+\dfrac{x^2}{\nu}\right)^{-(\nu+1)/2}$ | 0 si $\nu > 1$ | $\dfrac{\nu}{\nu-2}$ si $\nu > 2$ (infinita si $1 < \nu \leq 2$; no definida si $\nu \leq 1$) | La FGM no existe en un entorno de 0 (no es finita) |