

Probability density functions

1. $X \sim \text{Normal}(\mu, \sigma^2) : p(x|\mu, \sigma^2) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}, x \in \mathbb{R}$
2. $X \sim \text{Poisson}(\lambda) : p(x|\lambda) = \frac{\lambda^x e^{-\lambda}}{x!}, x \in \mathbb{N} \cup \{0\}$
3. $X \sim \text{Exponential}(\lambda) : p(x|\lambda) = \lambda e^{-\lambda x}, \lambda > 0, x \in [0, \infty)$
4. $X \sim \text{Bernoulli}(\theta) : p(x|\theta) = \theta^x (1 - \theta)^{1-x}, x \in \{0, 1\}$
5. $X \sim \text{Binomial}(n, \theta) : p(x|n, \theta) = \binom{n}{x} \theta^x (1 - \theta)^{n-x}, x \in \{0, 1, \dots, n\}$
6. $X \sim \text{Beta}(\alpha, \beta) : p(x|\alpha, \beta) = \frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1} (1-x)^{\beta-1}, x \in (0, 1)$
7. $X \sim \text{Gamma}(\alpha, \beta) : p(x|\alpha, \beta) = \frac{\beta^\alpha}{\Gamma(\alpha)} x^{\alpha-1} e^{-\beta x}, x \in (0, \infty)$
8. $X \sim \text{Inverse Gamma}(\alpha, \beta) : p(x|\alpha, \beta) = \frac{\beta^\alpha}{\Gamma(\alpha)} x^{-\alpha-1} e^{-\frac{\beta}{x}}, x \in (0, \infty)$

Please turn over