

List of common distributions

$$\text{Geometric}(x|\theta) = \theta(1 - \theta)^x \mathbb{1}(x \in \{0, 1, 2, \dots\}) \text{ for } 0 < \theta < 1$$

$$\text{Bernoulli}(x|\theta) = \theta^x(1 - \theta)^{1-x} \mathbb{1}(x \in \{0, 1\}) \text{ for } 0 < \theta < 1$$

$$\text{Binomial}(x|n, \theta) = \binom{n}{x} \theta^x(1 - \theta)^{n-x} \mathbb{1}(x \in \{0, 1, \dots, n\}) \text{ for } 0 < \theta < 1$$

$$\text{Poisson}(x|\theta) = \frac{e^{-\theta}\theta^x}{x!} \mathbb{1}(x \in \{0, 1, 2, \dots\}) \text{ for } \theta > 0$$

$$\text{Exp}(x|\theta) = \theta e^{-\theta x} \mathbb{1}(x > 0) \text{ for } \theta > 0$$

$$\text{Uniform}(x|a, b) = \frac{1}{b - a} \mathbb{1}(a < x < b) \text{ for } a < b$$

$$\text{Gamma}(x|a, b = \text{rate}) = \frac{b^a}{\Gamma(a)} x^{a-1} e^{-bx} \mathbb{1}(x > 0) \text{ for } a, b > 0,$$

$$\text{Gamma}(x|a, b = \text{scale}) = \frac{1}{b^a \Gamma(a)} x^{a-1} e^{-x/b} \mathbb{1}(x > 0) \text{ for } a, b > 0,$$

$$\text{Pareto}(x|\alpha, c) = \frac{\alpha c^\alpha}{x^{\alpha+1}} \mathbb{1}(x > c) \text{ for } \alpha, c > 0$$

$$\text{Beta}(x|a, b) = \frac{1}{B(a, b)} x^{a-1} (1 - x)^{b-1} \mathbb{1}(0 < x < 1) \text{ for } a, b > 0$$

$$\mathcal{N}(x|\mu, \sigma^2) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{1}{2\sigma^2}(x - \mu)^2\right) \text{ for } \mu \in \mathbb{R}, \sigma^2 > 0$$

$$\mathcal{N}(x|\mu, \lambda^{-1}) = \sqrt{\frac{\lambda}{2\pi}} \exp\left(-\frac{1}{2}\lambda(x - \mu)^2\right) \text{ for } \mu \in \mathbb{R}, \lambda > 0$$