Distributions

- $X \sim Bernoulli(p)$

$$f(x;p) = p^x(1-p)^{1-x}$$

$$E[X] = p, Var[X] = p(1-p)$$

- $X \sim Binomial(n,p)$

$$f(x;n,p) = \binom{n}{x} p^x(1-p)^{n-x}$$

$$E[X] = np, Var[X] = np(1-p)$$

- $X \sim N(\mu, \sigma^2)$

$$f(x;\mu,\sigma^2) = (2\pi\sigma^2)^{-1/2} \exp\left\{-\frac{1}{2\sigma^2}(x-\mu)^2\right\}$$

- $X \sim Beta(\alpha, \beta)$

$$f(x;\alpha,\beta) = \frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1}(1-x)^{\beta-1}$$

$$E[X] = \frac{\alpha}{\alpha+\beta}$$

- $X \sim Poisson(\lambda)$

$$f(x;\lambda) = \frac{e^{-\lambda}\lambda^x}{x!}$$

$$E[X] = Var[X] = \lambda$$

- $X \sim Exponential(\lambda)$

$$f(x;\lambda) = \lambda e^{-\lambda x}$$

$$E[X] = \frac{1}{\lambda}, Var[X] = \frac{1}{\lambda^2}$$