Probability Distributions

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1 Bernoulli Distribution

A *Bernoulli random variable*, X, takes the value 1 with probability p and 0 otherwise. Thus,

$$\begin{aligned} E(X) &= p \\ V(X) &= p(1-p). \end{aligned} \tag{1}$$

2 Binomial Distribution

A *Binomial random variable*, X, is a sum of n iid. Bernoulli random variables. We write $X \sim B(n, p)$. Trivially,

$$P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}. \tag{2}$$

From (1) it follows that

$$\begin{aligned} E(X) &= np \\ V(X) &= np(1-p). \end{aligned} \tag{3}$$