

Probability Methods in Engineering

Dr. Safdar Nawaz Khan Marwat DCSE, UET Peshawar

Lecture 17



Example

> Find the variance of the geometric random variable.





Important Discrete RVs

> Bernoulli Random Variable

- $> S_X = \{0, 1\}$
- $ho p_0 = q = 1 p, p_1 = p$
- \triangleright E[X] = p, VAR[X] = pq

> Binomial Random Variable

- $> S_X = \{0, 1, 2, ..., n\}$
- $P_k = C_k^n p^k q^{n-k}$
- \triangleright E[X] = np, VAR[X] = npq





Important Discrete RVs (cont.)

Geometric Random Variable

- $> S_X = \{1, 2, 3, ...\}$
- $P_k = q^{k-1}p$
- \triangleright $E[X] = 1/p, VAR[X] = q/p^2$
- > Uniform Random Variable
- $> S_X = \{1, 2, 3, ..., L\}$
- $ightharpoonup P_k = 1/L$
- \triangleright $E[X] = (L+1)/2, VAR[X] = (L^2-1)/12$





Example (cont.)

 \triangleright Show that the expected value of the binomial random variable is np.

