Probability Methods in Engineering

CSE-209

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Lecture 17

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Example

- Find the variance of the geometric random variable.

Important Discrete RVs

- Bernoulli Random Variable

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

- Binomial Random Variable

- $S_X = \{0, 1, 2, \ldots, n\}$
- $P_k = C^n_k \, p^k \, q^{n-k}$
- $E[X] = np, VAR[X] = npq$

Important Discrete RVs (cont.)

- Geometric Random Variable

- $S_X = \{1, 2, 3, ...\}$
- $P_k = q^{k-1}p$
- $E[X] = 1/p$, $VAR[X] = q/p^2$

- Uniform Random Variable

- $S_X = \{1, 2, 3, ... , L\}$
- $P_k = 1/L$
- $E[X] = (L+1)/2$, $VAR[X] = (L^2-1)/12$

Example (cont.)

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