

ECE 341: Probability and Random Processes for Engineers, Spring 2012

Homework 3

Name:

Assigned: 01.25.2012

Due: 02.01.2012

Problem 1. You are the manager of a ticket agency that sells concert tickets. You assume that people will call three times in an attempt to buy tickets, and then give up. You want to make sure that you are able to serve at least 95% of the people who want tickets. Let p be the probability that a caller gets through to your ticket agency. What is the minimum value of p necessary to meet your goal?

Solution 1:

Problem 2. The UIC Flames and the Northwestern Wildcats are in a best out of five game playoff series – they play games until one of the teams has won three games and is declared the winner. Assume that either team is equally likely to win any game independently of any other game played (an unrealistic assumption...). Find:

- The p.m.f. $P_N(n)$ for the total number N of games played in the series.
- The p.m.f. $P_F(f)$ for the number F of Flames wins in the series.
- The p.m.f. $P_W(w)$ for the number W of Wildcats losses in the series.

Solution 2:

Problem 3. Suppose a cellular phone costs \$20 per month with 30minutes of use included and that each additional minute of use costs \$0.50. If the number of minutes you use in a month is a geometric random variable M with expected value of $E[M] = 1/p = 30$ minutes, what is the p.m.f. of C , the cost of the phone for one month?

Solution 3:

Problem 4. The binomial random variable X has p.m.f.

$$P_X(x) = \binom{5}{x} (1/2)^5$$

- Find the standard deviation of the random variable X .
- What is $P[\mu_X - \sigma_X \leq X \leq \mu_X + \sigma + X]$, the probability that X is within one standard deviation of the expected value?

Solution 4: