Assignment #17

Due on Friday April 11, 2008

Read Section 5.4 on *The Poisson Distribution,* pp. 255–262, in DeGroot and Schervish.

Do the following problems

1. We have seen in the lecture that if X has a Poisson distribution with parameter $\lambda > 0$, then it has the pmf:

$$p_X(k) = \frac{\lambda^k}{k!}\, e^{-\lambda} \quad \text{for } k = 0, 1, 2, 3, \ldots; \text{ zero elsewhere.}$$

   Use the fact that the power series $\displaystyle\sum_{m=0}^{\infty} \frac{x^m}{m!}$ converges to e^x for all real values of x to compute the mgf of X.

   Use the mgf of X to determine the mean and variance of X.

2. Let $X_1,\ X_2,\ \ldots\ X_m$ be independent random variables satisfying $X_i \sim \text{Poisson}(\lambda)$ for all $i = 1, 2, \ldots, m$ and some $\lambda > 0$. Define

$$Y = X_1 + X_2 + \cdots + X_m.$$

   Determine the distribution of Y; that is, compute its pmf.

3. Exercise 2 on page 262 in the text

4. Exercise 6 on page 262 in the text

5. Exercise 8 on page 262 in the text