Mathematics 171 – HW7 – Due Thursday, May 19, 2011.

Problems 7.12, 7.15, 7.17, 7.22, 7.25, 7.33, 7.35 on pages 153-156 plus the following:

O. Consider a Markov chain \( X_n \) on \( \{0, 1, \ldots\} \) whose transition probabilities are defined as follows: \( p(k, l) = P(Y + Z = l) \), where \( Y, Z \) are independent, \( Y \) is \( B(k, p) \) and \( Z \) is Poisson \((\lambda)\).

(a) If \( X_0 \) is Poisson \((\gamma)\), what is the distribution of \( X_1 \)?
(b) If \( X_0 \) is Poisson \((\gamma)\), what is the distribution of \( X_n \)?
(c) If \( X_0 \) is Poisson \((\gamma)\), what is the limiting distribution of \( X_n \) as \( n \to \infty \)?
(d) What is the stationary distribution of the chain?