Recitation 19
May 4, 2006

1. Example 6.3 in text, page 316

2. parts (a) and (b) Problem 6.3 in text, page 354
   (c) the n-step transition probabilities can be generated by the recursive formula

$$r_{ij}(n) = \sum_{k=0}^{2} r_{ik}(n-1)p_{kj} \quad \text{for } n > 1, \text{and all } i, j$$

   starting with $r_{ij}(1) = p_{ij}$ where

$$[p_{ij}] = \begin{bmatrix} 1 & 0 & 0 \\ 0.4 & 0.6 & 0 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$$

   Plugging into the above formula gives :

$$[r_{ij}(2)] = \begin{bmatrix} 1 & 0 & 0 \\ 0.64 & 0.36 & 0 \\ 0.55 & 0.36 & 0.09 \end{bmatrix}$$

   Similarly

$$[r_{ij}(3)] = \begin{bmatrix} 1 & 0 & 0 \\ 0.784 & 0.216 & 0 \\ 0.721 & 0.252 & 0.027 \end{bmatrix}, \; [r_{ij}(5)] = \begin{bmatrix} 1 & 0 & 0 \\ 0.922 & 0.078 & 0 \\ 0.897 & 0.100 & 0.003 \end{bmatrix}, \; [r_{ij}(10)] = \begin{bmatrix} 1 & 0 & 0 \\ 0.994 & 0.006 & 0 \\ 0.992 & 0.008 & 0 \end{bmatrix}$$

   Eventually the spider will catch the fly, thus :

$$\lim_{n\to\infty} [r_{ij}(n)] = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$

3. Problem 6.4 in text, page 354