King Fahd University Of Petroleum & Minerals
Department of Mathematics & Statistics
STAT416 : Stochastic Processes for Actuaries (142)
Assignment # 2 (Due February 26, 2015)

Problem.1 A soccer player either makes a penalty hit goal or fault. Assume that if he makes a goal, the probability that the next hit is a fault is 0.40. If the first hit is fault, then he pays more attention and the probability that the next is fault is 0.20. Denote a goal by state 0 and a fault by state 1.

    a. Find the transition probability matrix .(4-Points)

    b. what is the probability that the fifth hit is a goal, given that the second hit was goal?(6-Points)

Problem.2 Consider a Markov chain with two states $\{0,1\}$, and a probability transition matrix $\boldsymbol{P}$ given by:

$$\boldsymbol{P} = \left(\begin{array}{cc} 0.4 & 0.6 \\ 0.6 & 0.4 \end{array} \right)$$

    (a.) Find $\boldsymbol{P}^2$ and $\boldsymbol{P}^4$ (2+2=4-Points)

    (b.) Find $\boldsymbol{P}^n$.(10-Points)

    (c.) If the initial vector is (0,1), find $\lim\limits_{n\to\infty} \boldsymbol{P}^n$ (6-Points)

    (a.) Find $P(X_9 = 0|X_5 = 0)$ (2-Points)

Problem.3 Solve problem 14 page 277 of your text book.(2+2+6+8=18-Points)