

STAT416 : Stochastic Processes for Actuaries (142) Quiz # 1
Name: **ID:**

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 \mathbf{P} given by:

$$\mathbf{P} = \begin{pmatrix} 0.4 & 0.6 \\ 0.6 & 0.4 \end{pmatrix}$$

- (a.) Find \mathbf{P}^2 and \mathbf{P}^4 (2+2=4-Points)
- (b.) Find \mathbf{P}^n .(10-Points)
- (c.) If the initial vector is (0,1), find $\lim_{n \rightarrow \infty} \mathbf{P}^n$ (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)