UC Berkeley
Department of Electrical Engineering and Computer Sciences

EE126: Probability and Random Processes

Discussion 6
Spring 2017

Date: Wednesday, March 1, 2017

Problem 1. Let $X \sim \mathcal{N}(\mu, \sigma^2)$ and $Y \sim \text{Poi}(\lambda)$. Find the Chernoff bounds for

(a) $P(X - \mu \geq \epsilon)$

(b) $P(Y - \lambda \geq \epsilon)$

Problem 2. A discrete-time Markov chain with seven states has the following transition probabilities:

$$p_{ij} = \begin{cases} 0.5, & (i,j) = (3,2), (3,4), (5,6) \text{ and } (5,7) \\ 1, & (i,j) = (1,3), (2,1), (4,5), (6,7) \text{ and } (7,5) \\ 0, & \text{otherwise} \end{cases}.$$

In the questions below, let X_k be the state of the Markov chain at time k.

(a) Give a pictorial representation of the discrete-time Markov chain.

(b) For what values of n is $\Pr(X_n = 5 \mid X_0 = 1) > 0$?

(c) What is the set of states $A(i)$ that are accessible from state i, for each $i = 1, 2, \ldots, 7$? Is the Markov chain irreducible?