Stochastic Processes and Probability Theory III

Assignment #5. Due Wednesday, June 3

1. Let $P_{ij} = \dfrac{e^{-i} i^j}{j!}$, $i, j = 0, 1, \ldots$ be the transition probabilities for a Markov chain X_n. We consider $P_{00} = 1$. Verify that X_n is a martingale.

2. Let X_n be a Markov chain whose transition probabilities are $P_{ij} = \frac{1}{e(j-i)!}$ for $i = 0, 1, \ldots$ and $j = i, i+1, \ldots$. Verify the martingale property for

   (a) $Y_n = X_n - n$

   (b) $U_n = Y_n^2 - n$

   (c) $V_n = e^{X_n - n(e-1)}$

3. Problem 35.1 from the text

4. Problem 35.6 from the text.

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