STAT 753 Homework 4
SPRING 2020

Due on Thursday March 5 at the beginning of lecture. Problems are from the Probability Models book (11th edition).

1. Chapter 4, Problem 14 (Use R!)
   For each of the Markov chains given in Problem 14, state whether a unique stationary distribution exists, and if so, what it is.

2. Chapter 4, Problem 15

3. Chapter 4, Problem 23

4. Chapter 4, Problem 35

5. Chapter 4, Problem 39

6. Write an algorithm in R to simulate the Gambler's ruin problem for general p and N. For illustration, use $p = 0.4$ and $N = 10$ and have the code compute and output the following items to the screen:

   (a) Transition matrices P and P_T (the latter being the matrix corresponding to transient state transition probabilities only).

   (b) The matrix of mean time spent in transient states, S.

   (c) The expected amount of time the gambler has \$7, given that they started with \$4.

   (d) The probability that starting with \$3, the gambler reaches \$9 before going broke.

   (e) **BONUS:** The probability that starting with \$1, the gambler reaches $N = \$10$ before going broke.

   Include your R code along with the answers to the items listed above.