
2. Find the period of the state 0 in the following Markov chains:

(a)

(b)

(c)
Turn-in problems, due Monday 2/23

1. Consider the queueing example we did in class with $p = 0.49$. If there are currently five customers in the system, what is (a) the expected time (number of changes) until there are again five customers and (b) the expected number of times the system is empty until it is back to five customers?

2. Let $\{X_n, n = 0, 1, \ldots\}$ be a Markov chain with transition matrix $P$ and define $Y_n = X_{2n}$.
   (a) The sequence $\{Y_n, n = 0, 1, \ldots\}$ is also a Markov chain. What is its transition matrix?
   (b) If $\{X_n\}$ is irreducible, must $\{Y_n\}$ be irreducible? Give proof or counterexample.
   (c) If $\{Y_n\}$ is irreducible, must $\{X_n\}$ be irreducible? Give proof or counterexample.

3. Book p.519, Problem 12. Note: the answer in the back of the book tells you that $p_{32} = 3/5$ and $p_{34} = 2/5$. Argue why this is the case, by computing probabilities or arguing intuitively.