Quiz 19 : Markov Chain Concepts

written by Alvin Wan . alvinwan.com/cs70 . Monday, November 14, 2016

This quiz does not count towards your grade. It exists to simply gauge your understanding. Treat this as though it were a portion of your midterm or final exam.

1   Definitions

Let X_i denote state i in a Markov chain.

1. (**True** or **False**) Markov chains can have more than one invariant distribution.

2. (**True** or **False**) It is necessarily true that X_{i+1} and X_{i-1} are uncorrelated.

3. (**True** or **False**) It is possible that $E[X_{i+1}X_i] = E[X_{i+1}]E[X_i]$. *Hint: Does X_{i+1} depend on X_i? Does it matter?*

2   Corollaries

For the following questions, provide a brief justification. Consider the following transition matrix.

$$P = \begin{bmatrix} 1 & a & 0 \\ a & 1-a & 0 \\ 0 & 0 & a \end{bmatrix}$$

1. (**True** or **False**) For P above, there exists an irreducible, periodic Markov Chain.

2. (**True** or **False**) There exists an irreducible, aperiodic Markov chains without a unique invariant distribution.