Review
Section 8.1-8.2, 6.5

April 21, 2016

Transition Matrices

Could this matrix possibly be a transition matrix?

$$\begin{bmatrix} .1 & .9 & .8 \\ .4 & .1 & .3 \\ .5 & 0 & .1 \end{bmatrix}$$

Could this matrix possibly be a transition matrix?

$$\begin{bmatrix} .1 & .9 & .8 \\ .6 & .1 & -.1 \\ .3 & 0 & .3 \end{bmatrix}$$

Could this matrix possibly be a transition matrix?

$$\begin{bmatrix} .1 & .7 \\ .9 & .3 \end{bmatrix}$$

Example: Sociology

- A sociologist postulates that the likelihood that in certain countries a woman will enter the labor force depends primarily on whether her mother worked.

- She designs an experiment to test this hypothesis by viewing the sequence of career choices of a woman, her daughters, her grand-daughters, her great-grand-daughters and so on.

Example: Women in the Labor Force

- Census studies from the 1960s reveal that in the US 80% of the daughters of women in the labor force also work outside of the home.

- 30% of the daughters of women not in the labor force work outside of the home. Assume that the trend remains unchanged from generation to generation.

Example: Women in the Labor Force

- Census studies from the 1960s reveal that in the US 60% of the daughters of women in the labor force also work outside of the home.

- 20% of the daughters of women not in the labor force work outside of the home. Assume that the trend remains unchanged from generation to generation.

Question

1. Write down the corresponding transition diagram.

2. Use your answer from the previous part to write down the transition matrix.

3. Assume that in generation 0, the probability that a woman works outside of the home is .23. What is the probability that a woman works outside of the home in generation 2?

Tree Diagram Example

We will play a game with a deck of 6 cards. Half of the deck is red, and the other half is black. In each turn, a player chooses a card (without replacement). The player wins the game as soon as the number of red cards she has chosen exceeds the number of black cards. The player loses as soon as she picks three black cards. What is the probability of winning the game?