

Section 10.4/ More Homework

- 1) A local pet shop keeps track of the color of the mice born in the shop. White mice have white offspring 70% of the time, and the rest of their offspring are spotted. Spotted mice have white offspring 20% of the time, and the rest of their offspring are spotted.
- a) Set up a transition matrix with this information.
b) Find the long range probability that a mouse will be spotted.
- 2) A person either smokes (S) or doesn't smoke (S'). An anti-smoking campaign appears to have the following effect on people:

$$\begin{array}{cc} & \text{AFTER CAMPAIGN} \\ & \begin{array}{cc} & S & S' \end{array} \\ \text{BEFORE CAMPAIGN} & \begin{array}{l} S \begin{bmatrix} .8 & .2 \end{bmatrix} \\ S' \begin{bmatrix} .1 & .9 \end{bmatrix} \end{array} \end{array}$$

Before the campaign, 80% of the people smoke and 20% do not. Suppose the campaign is run 3 times. What will the distribution of smokers and non-smokers be then?

- 3) Increasing diet awareness and economic changes have led a medical researcher studying heart attacks to revise her transition matrix for weight categories among males. The categories are thin (T), normal (N), and overweight (O). The new matrix follows:

$$\begin{array}{cc} & \text{OFFSPRING} \\ & \begin{array}{ccc} & T & N & O \end{array} \\ \text{CURRENT INDIVIDUAL} & \begin{array}{l} T \begin{bmatrix} .4 & .5 & .1 \end{bmatrix} \\ N \begin{bmatrix} .3 & .5 & .2 \end{bmatrix} \\ O \begin{bmatrix} .2 & .5 & .3 \end{bmatrix} \end{array} \end{array}$$

Find the probability that a:

- a) thin man has an overweight child?
b) a child of normal weight is born to an overweight man?

Section 10.4/ Homework Answers

1a)

$$\begin{array}{cc} & W & S \\ W & \begin{bmatrix} .7 & .3 \end{bmatrix} \\ S & \begin{bmatrix} .2 & .8 \end{bmatrix} \end{array}$$

1b) .6

2) 49.34% smoke and 50.66% do not.

3a) .1

3b) .5