

HW 7 1-4

A B C D E

① a)

$$A = \begin{bmatrix} 0 & \frac{1}{3} & 0 & \frac{1}{2} & \frac{1}{2} \\ \frac{1}{3} & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & \frac{1}{3} & 0 & \frac{1}{2} & 0 \\ \frac{1}{3} & 0 & \frac{1}{2} & 0 & 0 \\ \frac{1}{3} & \frac{1}{3} & 0 & 0 & 0 \end{bmatrix}$$

b)  $\lambda=1 \rightarrow A - I =$

$$\begin{bmatrix} 1 & 0 & 0 & 0 & -\frac{3}{2} \\ 0 & 1 & 0 & 0 & \frac{3}{2} \\ 0 & 0 & 1 & 0 & -1 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

A

②

$$\begin{bmatrix} 0 & 0 & 0 & 1 \\ \frac{1}{3} & 0 & \frac{1}{2} & 0 \end{bmatrix}$$

A = 30%

$$x_1 = \frac{3}{2}x_5$$

$$\left[ \frac{3}{2} \right]$$

$$x_2 = \frac{3}{2}x_5$$

$$\left[ \frac{3}{2} \right]$$

B = 30%

$$x_3 = x_5$$

$$\left[ 1 \right]$$

C = 20%

$$x_4 = x_5$$

$$\left[ 1 \right]$$

D = 20%

D = 28.57%

③ a) sunny cloudy rainy

sunny	0.65	0.25	0.25
cloudy	0.1	0.25	0.15
rainy	0.25	0.5	0.6

= A

b) Starting Vector:

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} = x_0$$

$$A^4 x_0 = \begin{bmatrix} 0.43 \\ 0.14 \\ 0.43 \end{bmatrix}$$

Sunny: 43%

Cloudy: 14%

Rainy: 43%

② a)

$$\begin{bmatrix} 0 & 0 & 0 & 1 \\ \frac{1}{3} & 0 & \frac{1}{2} & 0 \\ \frac{1}{3} & 1 & 0 & 0 \\ \frac{1}{3} & 0 & \frac{1}{2} & 0 \end{bmatrix}$$

b)  $A v = v$

$$v = \begin{bmatrix} 1 \\ 1 \\ \frac{1}{3} \\ 1 \end{bmatrix}$$

A: 23%

B: 23%

C: 31%

D: 23%

HW 7 1-4 cont'd

(4)

a)

0.58	0	0.265	0
0.42	0.29	0.265	0
0	0.355	0.47	0.69
0	0.355	0	0.31

b) Probability of no rain on the weekend: 13.57%.