

ANSWERS TO ODD NUMBERED HW PROBLEMS IN CHAPTER 10 MARKOV CHAINS AND ALL CHAPTER REVIEW QUESTIONS

10.1 Markov Chains

- 1). a. No b. No
3). a. $\begin{bmatrix} 0 & 1 \\ 1/2 & 1/2 \end{bmatrix}$ b. 1/2 c. 1/2 d. 3/4
5). a. 0.3 b. 0.38 c. 0.15 d. 0.175

10.2 Applications of Markov chains

1) a).93 b).05 c).1 d).20

3) a).2 b).3 c) 0 d).5

5) a)

$$T = \begin{matrix} & \begin{matrix} A & B & C & D \end{matrix} \\ \begin{matrix} A \\ B \\ C \\ D \end{matrix} & \begin{bmatrix} 0 & .3 & .5 & .2 \\ .5 & 0 & 0 & .5 \\ 0 & .1 & .7 & .2 \\ .2 & .4 & .1 & .3 \end{bmatrix} \end{matrix}$$

b).20 c).25
d).27 e).7
f) 0

10.3 Regular Markov Chains

1) a) No b) No

3) a).876 b).[.875 .125]

5) a).548

b) [.14 .38 .48] after $n=2$ transitions
[.125 .312 .563] after $n=5$ transitions

c) [.125 .30 .575] long run distribution

d) same as (c)

7) a) See 10.2 #5 part (a) for T b) $m = (4-1)^2 + 1 = 16$

c) Yes

d) 15.67% visit site A, 19.8% site B, 35.71% site C, 28.82% site D

e) Highest to Lowest: C, D, B, A

10.4 Absorbing Markov Chains

1). a. 1 and 3

b).

c). $2/3$

d). $1/2$

$$\begin{matrix} & & 1 & 3 \\ 2 & \left[\begin{array}{cc} 1/2 & 1/2 \\ 2/3 & 1/3 \end{array} \right] \\ 4 & \end{matrix}$$

3). a).

$$\begin{matrix} & 0 & 1 & 2 & 3 & 4 \\ 0 & \left[\begin{array}{ccccc} 1 & 0 & 0 & 0 & 0 \\ .6 & 0 & .4 & 0 & 0 \\ 0 & .6 & 0 & .4 & 0 \\ 0 & 0 & .6 & 0 & .4 \\ 0 & 0 & 0 & 0 & 1 \end{array} \right] \\ 1 & \\ 2 & \\ 3 & \\ 4 & \end{matrix}$$

b). Andre's solution matrix

$$\begin{matrix} & 0 & 4 \\ 1 & \left[\begin{array}{cc} 57/65 & 8/65 \\ 9/13 & 4/13 \\ 27/65 & 38/65 \end{array} \right] \\ 2 & \\ 3 & \end{matrix}$$

c). $27/65$

d). $27/65$

5). a).

$$\begin{matrix} & G & B & I \\ G & \left[\begin{array}{ccc} 1 & 0 & 0 \\ 0 & 1 & 0 \\ .60 & .20 & .20 \end{array} \right] \\ B & \\ I & \end{matrix}$$

b. I and II

c. $[0.75 \ 0.25]$

d. 0.75

7) a). .445 b). .245 c). .26

9). .6691 11) 30.22% dropout, 69.78% graduate

12) 10/19

10.5 Chapter Review Markov Chains

1). No; no

2). 0.2; 0.3; 0.475

3). a. $\begin{bmatrix} 0 & 1 \\ 2/3 & 1/3 \end{bmatrix}$ b. 1 c. $2/3$

4) a) No b) Yes

5) a) .3 b) .31 c) .28

6) a) .32 b) $[2/3 \ 1/3]$

7) a) $[\cdot 36 \cdot 34 \cdot 30]$

b) $[3/7 \ 9/28 \ 1/4]$

8). a. S1 and S2 b).

c). $26/35$ d). $19/35$

	S1	S2
S3	$16/35$	$19/35$
S4	$26/35$	$9/35$

9). $2/7$

10). $3/7$