

Week in Review # 10

1. (a) not regular
(b) regular

$$2. X_L = \begin{bmatrix} 0.25 \\ 0.75 \end{bmatrix}$$

$$3. X_L = \begin{bmatrix} 35/107 \\ 50/107 \\ 22/107 \end{bmatrix} = \begin{bmatrix} 0.3271 \\ 0.4673 \\ 0.2056 \end{bmatrix}$$

4. The absorbing state is C.
This diagram does represent an absorbing markov process.

5. The absorbing state is C.
This diagram does not represent an absorbing markov process since you can not get from state A and B to state C.

6. (a) no
(b) yes

7. First write the transition in the ocrrect form.

$$T = \begin{matrix} & \begin{matrix} B & D & A & C \end{matrix} \\ \begin{matrix} B \\ D \\ A \\ C \end{matrix} & \begin{bmatrix} 1 & 0 & 0.3 & 0.1 \\ 0 & 1 & 0.2 & 0.1 \\ 0 & 0 & 0.1 & 0.5 \\ 0 & 0 & 0.4 & 0.3 \end{bmatrix} \end{matrix}$$

$$L = \begin{matrix} & \begin{matrix} B & D & A & C \end{matrix} \\ \begin{matrix} B \\ D \\ A \\ C \end{matrix} & \begin{bmatrix} 1 & 0 & 0.5814 & 0.5581 \\ 0 & 1 & 0.4186 & 0.4419 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \end{matrix}$$

$$8. (a) L = \begin{matrix} & \begin{matrix} A & B & C & D & E \end{matrix} \\ \begin{matrix} A \\ B \\ C \\ D \\ E \end{matrix} & \begin{bmatrix} 1 & 0 & 0 & 0.2813 & 0.3438 \\ 0 & 1 & 0 & 0.4375 & 0.3125 \\ 0 & 0 & 1 & 0.2813 & 0.3438 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{matrix}$$

- (b) 0.4375
(c) 0.3438

$$(d) F = \begin{matrix} & \begin{matrix} D & E \end{matrix} \\ \begin{matrix} D \\ E \end{matrix} & \begin{bmatrix} 2.188 & 1.563 \\ 0.625 & 1.875 \end{bmatrix} \end{matrix}$$

- (e) 2.813
(f) 1.563

9. E1= the exit in room C
E2 = the exit in room B

$$(a) T = \begin{matrix} & \begin{matrix} E1 & E2 & A & B & C \end{matrix} \\ \begin{matrix} E1 \\ E2 \\ A \\ B \\ C \end{matrix} & \begin{bmatrix} 1 & 0 & 0 & 0 & 1/3 \\ 0 & 1 & 0 & 0.25 & 0 \\ 0 & 0 & 0 & 0.5 & 1/3 \\ 0 & 0 & 2/3 & 0 & 1/3 \\ 0 & 0 & 1/3 & 0.25 & 0 \end{bmatrix} \end{matrix}$$

$$L = \begin{matrix} & \begin{matrix} E1 & E2 & A & B & C \end{matrix} \\ \begin{matrix} E1 \\ E2 \\ A \\ B \\ C \end{matrix} & \begin{bmatrix} 1 & 0 & 0.4615 & 0.3846 & 0.6154 \\ 0 & 1 & 0.5385 & 0.6154 & 0.3846 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{matrix}$$

- (b) 46.15%

$$(c) F = \begin{matrix} & \begin{matrix} A & B & C \end{matrix} \\ \begin{matrix} A \\ B \\ C \end{matrix} & \begin{bmatrix} 2.5385 & 1.6154 & 1.3846 \\ 2.1538 & 2.4615 & 1.5385 \\ 1.3846 & 1.1538 & 1.8462 \end{bmatrix} \end{matrix}$$

$$(d) 2.5385 + 2.1538 + 1.3846 = 6.077$$

$$\text{Answer} = 6.077 * 2 = 12.154 \text{ minutes}$$

$$(e) 2.1538 * 2 = 4.3076 \text{ minutes}$$

$$(f) 1.1538*2 = 2.3076 \text{ minutes}$$