DayPark _ Chapter 5

Exb

a)

$$(No Inj) \begin{pmatrix} 0.98 & 0.02 \\ 0 & 1 \end{pmatrix} ?$$

if a person get injury, He should get out of work!

b) It is irreducible, all states communicate

c) $P^{\infty} = \begin{bmatrix} 0 & [\ldots] \\ 0 & [\ldots] \end{bmatrix} \rightarrow$ No periodic

d) No stationary distribution

There is no prob > 0 at Row 2.

e) State (injured) is positive recurrent
Because it is absorbing.

otherwise, transient!

Ex6

Considering following transition matrix

$$P = \begin{bmatrix} .6 & .5 & .4 & .5 \\ .6 & 0 & .4 & 0 \\ 0 & 0.7 & 0 & 0.3 \\ 0.8 & 0 & 0.2 & 0 \end{bmatrix}$$

a)

① $P^{100} = \begin{bmatrix} 0.6875 & 0 & 0.3125 & 0 \\ 0 & 0.5625 & 0 & 0.4375 \\ 0.6875 & 0 & 0.3125 & 0 \\ 0 & 0.5625 & 0 & 0.4375 \end{bmatrix}$

② $P^{101} \begin{bmatrix} 0 & 0.5625 & 0 & 0.4375 \\ 0.6875 & 0 & 0.3125 & 0 \\ 0 & 0.5625 & 0 & 0.4375 \\ 0.6875 & 0 & 0.3125 & 0 \end{bmatrix}$

As we can see,
P(limited) has two state
like ①, ②
And these are repeated!

So ② periodic

b) $A = \begin{bmatrix} P & \vdots \\ & \vdots \end{bmatrix}$ $b = (0 \ 0 \ 0 \ 1)$

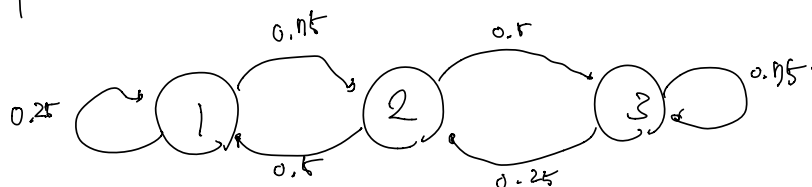$$\boxed{A \times A^T \times \pi^T = A \times b^T}$$

As a result I can get π us

$\pi = [0.34375, \ 0.28125, \ 0.15625, \ 0.21875]$

$\pi \times P = \pi$

Therefore, π vector is stationary distribution

C) 문제 이러를 못하겠습니다 ...

Ex14

a) transition P matrix

$$P = \begin{pmatrix} 0.25 & 0.75 & 0 \\ 0.5 & 0 & 0.5 \\ 0 & 0.25 & 0.75 \end{pmatrix}$$

b)

$$A = \begin{pmatrix} P & \begin{matrix} 1 \\ 1 \\ 1 \end{matrix} \end{pmatrix}$$

$b = (0 \ 0 \ 0 \ 1)$

$$\underline{A \times A^T_i V^+ = A \times b^T} \quad \sim \quad \text{from this equation we should get } V^+$$

$V = [0.1818 \cdots, \ 0.2727 \cdots, \ 0.5454 \cdots]$

$V. Sum()$ is also 1

So Stationary vector (distribution) is $V =$

$[0.1818 \cdots, \ 0.2727 \cdots, \ 0.5454 \cdots]$

c)

$$P^\infty = \begin{pmatrix} 0.1818\cdots & 0.2727\cdots & 0.5454 \\ 0.1818\cdots & 0.2727\cdots & 0.5454\cdots \\ 0.1818\cdots & 0.2727\cdots & 0.5454\cdots \end{pmatrix}$$

Therefore, 2 is $0.2727\cdots$

3 is $0.5454\cdots$

d) eval $\Rightarrow x = 5000 + n^2 \times 5000$, $n = 1, 2, 3$

$\underline{Salary = (10000, 25000, 50000)}$

$salary \times V^+ = 35909.0909\cdots$