HW 3)

[a.2 0.7 0.1]

$$\pi_1 + \frac{23}{4}\pi_1 + \frac{13}{4}\pi_1 = 1$$

$$\pi_1 + \frac{23}{9}\pi_1 + \frac{13}{9}\pi_2$$

$$\frac{q+23+13}{9}\pi,-1 \qquad \pi,=\frac{1}{5}$$

$$\frac{45\pi}{9}\pi,=1$$

$$\frac{45\pi}{9}\pi,=1$$

$$\Rightarrow \left[\pi_{\text{bo},1} \ \pi_{\text{bo},2} \ \pi_{\text{bo},2} \right] \begin{bmatrix} 0.2 & 0.7 & 0.1 \\ 0.2 & 0.5 & 0.3 \\ 0.2 & 0.4 \end{bmatrix} = \left[\pi_{\text{bo},1} \ \pi_{\text{bo},2} \ \pi_{\text{bo},3} \right]$$

$$\Rightarrow \begin{bmatrix} \pi_{\omega_{1}} & \pi_{\omega_{2}} & \pi_{\omega_{1}} \end{bmatrix} \begin{bmatrix} 0.2 & 0.5 & 0.3 \\ 0.2 & 0.4 & 0.4 \end{bmatrix} = \begin{bmatrix} \pi_{\omega_{1}} & \pi_{\omega_{2}} & \pi_{\omega_{1}} \\ 0.2 & 0.4 & 0.4 \end{bmatrix}$$

$$0.2 + 0.2 = 0.2$$

$$0.2\pi_{1} + 0.2\pi_{2} + 0.2\pi_{3} = \pi_{1} \qquad (3) - 0.8\pi_{1} + \frac{46}{90}\pi_{1} + 0.2\left(\frac{1}{6}\pi_{1} + \frac{1}{2}\frac{2}{3}\pi_{1} + \frac{1}{2}\frac{2}{3$$

$$0.2\pi_{1} + 0.2\pi_{2} + 0.2\pi_{3} = \pi_{1} \qquad (3) - 0.8\pi_{1} + \frac{46}{90}\pi_{1} + 6.2\left(\frac{1}{6}\pi_{1} + \frac{1}{2}, \frac{1}{6}\pi_{1}\right) + \frac{1}{2} \cdot \frac{1}{6}\pi_{1}$$

$$0.7\pi_{1} + 0.5\pi_{2} + 0.4\pi_{3} = \pi_{3} = -0.9\pi_{1} + \frac{46}{90}\pi_{1} + \frac{1}{30}\pi_{1}$$

$$0.1\pi_{1} + 0.3\pi_{2} + 0.4\pi_{3} = \pi_{3} = \frac{23}{9}\pi_{1}$$

$$0.7\pi_{1} + 0.5\pi_{2} + 0.4\pi_{3} = \pi_{3}$$

$$= -0.8\pi_{1} + \frac{46}{90}\pi_{1} + \frac{1}{30}\pi_{1}$$

$$+ \frac{2}{10} \cdot \frac{1}{7} \cdot \frac{23}{9}\pi_{1}$$

$$-0.8\pi_{1} + 6.2\pi_{2} + 0.2\pi_{3} = 0$$

$$-8.9\pi_{1} + 96\pi_{1} + 3\pi_{1} + 23\pi_{1}$$

$$= 0.4\pi_{2} = 0$$

$$-0.8\pi, +6.2\pi_2 + 0.2\pi_3 = 0$$

$$-8.9\pi, +96\pi, +3\pi, +23\pi = 0$$

$$0.7\pi, -0.5\pi_2 +0.4\pi_3 = 0$$

$$0.7\pi, +0.3\pi_2 -0.6\pi_3 = 0$$

$$0.7\pi, = \pi = \pi = \pi = \pi$$

$$0.|T_{1}| + 0.3\pi_{2} - 0.6\pi_{3} = 6$$

$$0.|T_{1}| + 0.3\pi_{2} - 0.6\pi_{3} = 6$$

$$0.6\pi_{3} = 0.|\pi_{1}| + 0.3\pi_{2}$$

$$0.6\pi_{3} = 0.|\pi_{1}| + 0.3\pi_{2}$$

$$0.6\pi_{3} = 0.|\pi_{1}| + 0.3\pi_{2}$$

$$0.|\Pi_{1} + 0.3\Pi_{2} - 0.6\Pi_{3} = 8$$

$$0.6\Pi_{3} = 0.|\Pi_{1} + 0.3\Pi_{2}$$

$$0.6\Pi_{3} = 0.|\Pi_{1} + 0.3\Pi_{2}$$

$$0.6\Pi_{3} = \frac{1}{6}\Pi_{1} + \frac{1}{2}\Pi_{2} = \frac{1}{6}\Pi_{1} + \frac{23}{4}\Pi_{1} = \frac{26}{18}\Pi_{1}$$

$$(1) \qquad \Pi_{3} = \frac{1}{6}\Pi_{1} + \frac{1}{2}\Pi_{2} = \frac{1}{6}\Pi_{1} + \frac{23}{4}\Pi_{1} = \frac$$

(1)
$$TT_3 = \frac{1}{6}\pi_1 + \frac{1}{2}\pi_2 = \frac{1}{6}\pi_1 + \frac{1}{2}\frac{23}{6}\pi_1 = \frac{3\pi_1 + 29\pi_2}{18}$$

(2) $0.7\pi_1 - 0.5\pi_2 + 0.4(\frac{1}{6}\pi_1 + \frac{1}{2}\pi_2) = 0$
 $0.7\pi_1 - 0.5\pi_2 + \frac{1}{15}\pi_1 + \frac{1}{5}\pi_2 = 0$

29 cont.

we notice that: PTV = NV where NEIR, VEIR3

is eigenvector of PT.

if we let $\lambda = 1$, $\vec{V} = \pi \infty$

PTJ: 1. J => PTAN = TN

Sab tract Two from both sides:

PT-10 - 0

 $(P^{T}-I_{(3x^{3})})\pi \omega = 0$

$$\rho = \begin{bmatrix} 0.2 & 6.7 & 6.1 \\ 6.2 & 0.5 & 0.3 \\ 0 & 6 & 1 \end{bmatrix}$$

$$E[T_{1}] = 1 + 6.2 E[T_{1}] + 6.7 E[T_{2}] + 0.1 E[T_{3}]$$

=> M,= 1+0.2M, +0.7 M2 +0

>> = 1 M2=3 M, +1

M2=1+0.2M, +0.5M2 +0

M2=2 M, 12

 $M = 1 + \frac{1}{5}M_1 + \frac{7}{10}(\frac{2}{3}M_1 + 2)$

 $\frac{13}{25} \mathcal{A}_{1} = \frac{12}{5} \frac{25}{3} = \frac{60}{13}$ $= 2 \mathcal{A}_{2} = \frac{24}{13} + 2 = \frac{50}{13}$

> A,= 1+ 3 A, + 7 A, + 7 €

 $\frac{25-5-7}{25}\mu_{1} = \frac{12}{5}$

E[T3]:0

M3:0

$$E[T_1] = 1 + 6.2 E[T_1] + 6.7 E[T_2] + 0.1 E[T_3]$$

$$E[T_2] = 1 + 6.2 E[T_1] + 0.5 E[T_2] + 0.3 E[T_3]$$