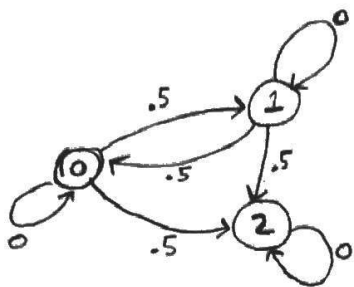


1.

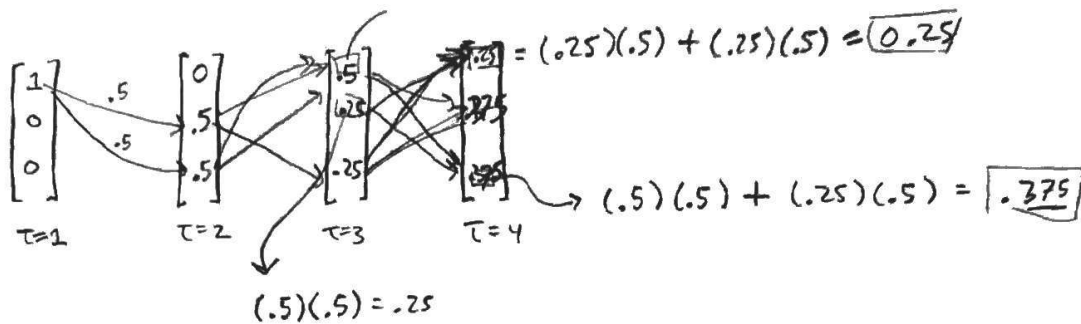


2.

	0	1	2
0	0	.5	.5
1	.5	0	.5
2	.5	.5	0

$$(.5) \cdot (.5) + (.5)(.5) = .5$$

3.



4. Let  $\pi = P_{\infty}$

$$\pi_0 = (.5)\pi_1 + (.5)\pi_2 \rightarrow 2\pi_0 = \pi_1 + \pi_2 \rightarrow \boxed{2\pi_0 = 1 - \pi_0}$$

$$\pi_1 = (.5)\pi_0 + (.5)\pi_2 \rightarrow 2\pi_1 = \pi_0 + \pi_2 \rightarrow 2\pi_1 = 1 - \pi_1$$

$$\pi_2 = (.5)\pi_0 + (.5)\pi_1 \rightarrow 2\pi_2 = \pi_0 + \pi_1 \rightarrow 2\pi_2 = 1 - \pi_2$$

$$\boxed{\pi_0 + \pi_1 + \pi_2 = 1}$$

CONSTRAINT

Steady state is:

$$\left(\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right)$$

$$1 - \pi_0 = 2\pi_0$$

$$\rightarrow 1 - 3\pi_0 = 0$$

$$-3\pi_0 = -1$$

$$\rightarrow \boxed{\pi_0 = \frac{1}{3}}$$