Math Solutions

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1.

(a) $P = \begin{pmatrix} 0.2 & 0.7 & 0.1 \\ 0.2 & 0.5 & 0.3 \\ 0.2 & 0.4 & 0.4 \end{pmatrix}$

2. (a) $(P^T - I)\pi_\infty = 0 \Rightarrow \begin{pmatrix} -0.8 & 0.2 & 0.2 \\ 0.7 & -0.5 & 0.4 \\ 0.1 & 0.3 & -0.6 \end{pmatrix}\begin{pmatrix} \pi_1 \\ \pi_2 \\ \pi_3 \end{pmatrix} = 0 \Rightarrow \begin{cases} \pi_1 = \frac{1}{5} \\ \pi_2 = \frac{23}{45} \\ \pi_3 = \frac{13}{45} \end{cases}$

3. (b) $\begin{cases} \mu_1 = 1 + 0.2\mu_1 + 0.7\mu_2 + 0.1\mu_3 \\ \mu_2 = 1 + 0.2\mu_1 + 0.5\mu_2 + 0.3\mu_3 \\ \mu_3 = 0 \end{cases} \Rightarrow \begin{cases} \mu_1 = \frac{60}{13} \\ \mu_2 = \frac{50}{13} \\ \mu_3 = 0 \end{cases}$