

Show all work for full credit, and use correct notation. Simplify answers completely.

The non-zero transition rates for a 4-state model are:

$$\mu_x^{01} = .04$$

$$\mu_x^{02} = .02$$

$$\mu_x^{21} = .01$$

$$\mu_x^{23} = .03$$

$$\mu_x^{13} = .001e^{0.1x} = \mu_x^{31}$$

Determine

1. ${}_{10}p_{30}^{12}$

2. Show that ${}_{10}p_{30}^{00} = e^{-0.6} \approx 0.5488$

3. Show that ${}_{10}p_{30}^{02} = e^{-0.4} - e^{-0.6} \approx 0.1215$

You are also given ${}_{10}p_{30}^{01} \approx 0.2587$ and ${}_{10}p_{30}^{03} \approx 0.0710$.

4. Determine ${}_{10}\dot{p}_{30}^{03}$

5. Use Euler's Forward Equation with step size equal to 0.2 to approximate ${}_{10.2}p_{30}^{03}$