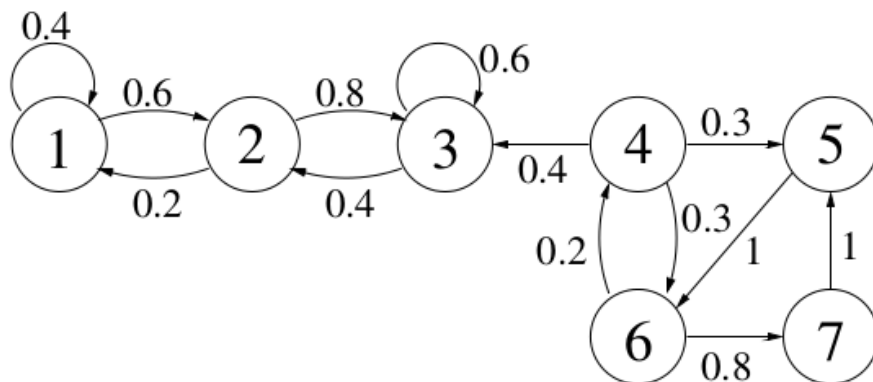


12. Exercise: Steady-state calculation

Exercise: Steady-state calculation

4/4 points (ungraded)

Consider again the Markov chain with the following transition probability graph:



Find the steady state distribution of the Markov chain.

$\pi_1 =$ ✓ Answer: 0.1

$\pi_2 =$ ✓ Answer: 0.3

$\pi_3 =$ ✓ Answer: 0.6

$\pi_4 =$ ✓ Answer: 0

$\pi_5 =$ ✓ Answer: 0

$\pi_6 =$ ✓ Answer: 0

$\pi_7 =$ ✓ Answer: 0

Solution:

First note that states **4** through **7** are transient since the chain will eventually transition from state **4** to state **3** and never return. Transient states have zero steady-state probability, so $\pi_4 = \pi_5 = \pi_6 = \pi_7 = 0$.

Hence, to calculate the rest of the steady-state probabilities, we can simply focus on the part of the chain involving states **1** through **3**. The balance and normalization equations are

$$\pi_1 = \pi_1 p_{11} + \pi_2 p_{21} = 0.4\pi_1 + 0.2\pi_2$$

$$\pi_2 = \pi_1 p_{12} + \pi_3 p_{32} = 0.6\pi_1 + 0.4\pi_3$$

$$\pi_3 = \pi_2 p_{23} + \pi_3 p_{33} = 0.8\pi_2 + 0.6\pi_3$$

$$1 = \pi_1 + \pi_2 + \pi_3$$

Solving for π_1, π_2, π_3 , we obtain $\pi_1 = 0.1$, $\pi_2 = 0.3$, and $\pi_3 = 0.6$.

提交

你已经尝试了2次 (总共可以尝试3次)