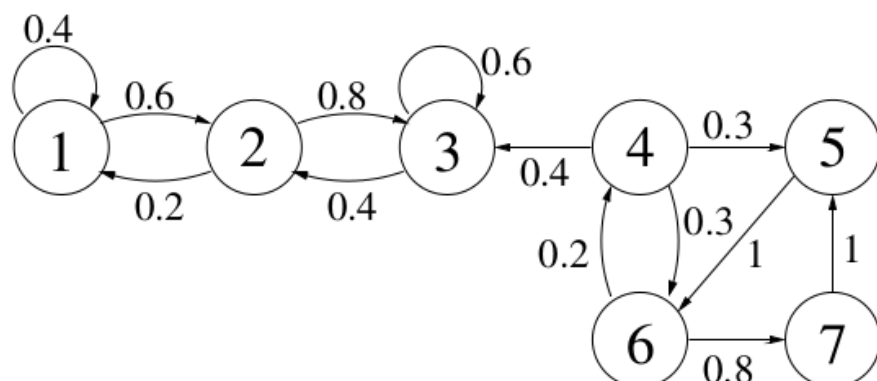


5. Exercise: Path calculation

Exercise: Path calculation

3/3 points (ungraded)

Consider a Markov chain with the following transition probability graph:



1.

$$\mathbf{P}(X_1 = 6, X_2 = 4, X_3 = 3 \mid X_0 = 4) = \boxed{0.024} \quad \checkmark \text{ Answer: } 0.024$$

2.

$$\mathbf{P}(X_{103} = 3 \mid X_{100} = 1) = \boxed{0.48} \quad \checkmark \text{ Answer: } 0.48$$

Solution:

1. The desired probability corresponds to a unique path through the Markov chain. Hence, we can simply multiply one-step transition probabilities along the path:

$$\mathbf{P}(X_1 = 6, X_2 = 4, X_3 = 3 \mid X_0 = 4) = p_{46}p_{64}p_{43} = (0.3)(0.2)(0.4) = 0.024.$$

2. We are looking for the 3-step transition probability from state 1 to state 3, $r_{13}(3)$. We can always use the recursion formula to calculate this, but in this particular case, we can directly observe that there are only 2 possible paths: $1 \rightarrow 1 \rightarrow 2 \rightarrow 3$ and $1 \rightarrow 2 \rightarrow 3 \rightarrow 3$. Hence,

$$\begin{aligned} \mathbf{P}(X_{103} = 3 \mid X_{100} = 1) &= p_{11}p_{12}p_{23} + p_{12}p_{23}p_{33} \\ &= (0.4)(0.6)(0.8) + (0.6)(0.8)(0.6) \\ &= 0.48. \end{aligned}$$

提交

你已经尝试了2次 (总共可以尝试3次)

i Answers are displayed within the problem

讨论

显示讨论

主题: Unit 10 / Lec. 25 / 5. Exercise: Path calculation