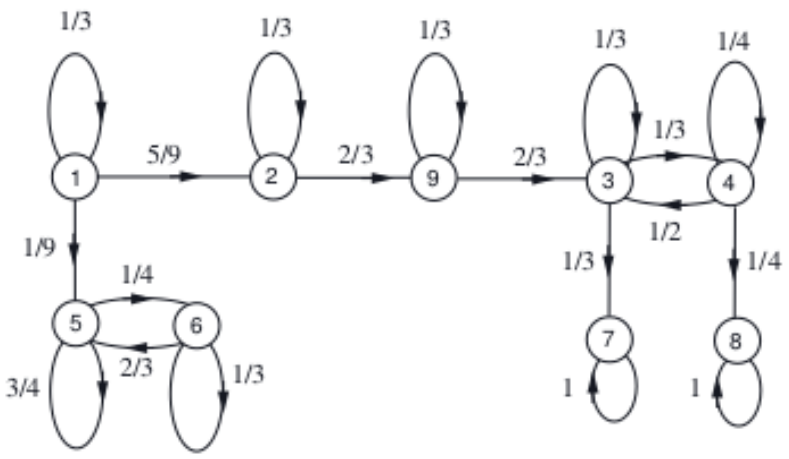
9. Exercise: Probability of absorption

Exercise: Probability of absorption

2/2 points (ungraded)

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



Assuming that the Markov chain is initially in state 2 (i.e., $X_0 = 2$), what is the probability that the chain eventually reaches state 7?

3/4

✔ **Answer:** 0.75

Solution:

Let a_j be the probability that the Markov chain eventually reaches state 7 given that it started in state j. We want to calculate a_2. First note that $a_2 = a_3$ since the chain must eventually go from state 2 to state 9 to state 3 (after some number of self-transitions at states 2 and 9). Now we can write a system of two equations with two unknowns (a_3 and a_4) as follows:

$$\begin{aligned} a_3 &= p_{33}a_3 + p_{34}a_4 + p_{37}a_7 = \frac{1}{3}a_3 + \frac{1}{3}a_4 + \frac{1}{3}\cdot 1 \\ a_4 &= p_{43}a_3 + p_{44}a_4 + p_{48}a_8 = \frac{1}{2}a_3 + \frac{1}{4}a_4 + \frac{1}{4}\cdot 0. \end{aligned}$$

Solving, we obtain $a_4 = 1/2$ and $a_2 = a_3 = 3/4$.

提交 你已经尝试了1次（总共可以尝试3次）

Answers are displayed within the problem

讨论

显示讨论

主题： Unit 10 / Lec. 26 / 9. Exercise: Probability of absorption