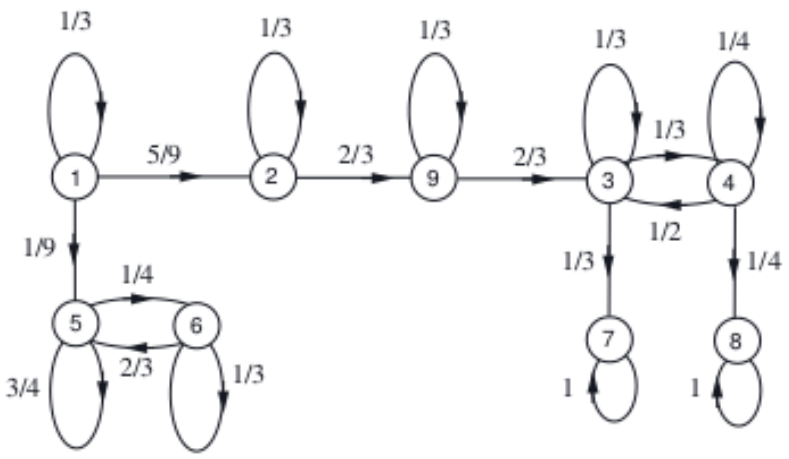
11. Exercise: Expected time to absorption

Exercise: Expected time to absorption

2/2 points (ungraded)

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



Assuming that $X_0 = 9$, what is the expected time until the Markov chain eventually reaches states 7 or 8?

19/4

✔ **Answer:** 4.75

Solution:

States 7 and 8 can be combined into a mega-state, say state 10. Let μ_j be the expected time to eventually reach state 10 given that the chain starts in state j. We want to calculate μ_9. We can write a system of three equations with three unknowns (μ_9, μ_3 and μ_4) as follows:

$$\begin{aligned}
\mu_9 &= 1 + \frac{1}{3}\mu_9 + \frac{2}{3}\mu_3 \\
\mu_3 &= 1 + \frac{1}{3}\mu_3 + \frac{1}{3}\mu_4 \\
\mu_4 &= 1 + \frac{1}{2}\mu_3 + \frac{1}{4}\mu_4,
\end{aligned}$$

which gives the solution $\mu_3 = 13/4$, $\mu_4 = 14/4$, and $\mu_9 = 19/4$.

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

主题： Unit 10 / Lec. 26 / 11. Exercise: Expected time to absorption

显示讨论