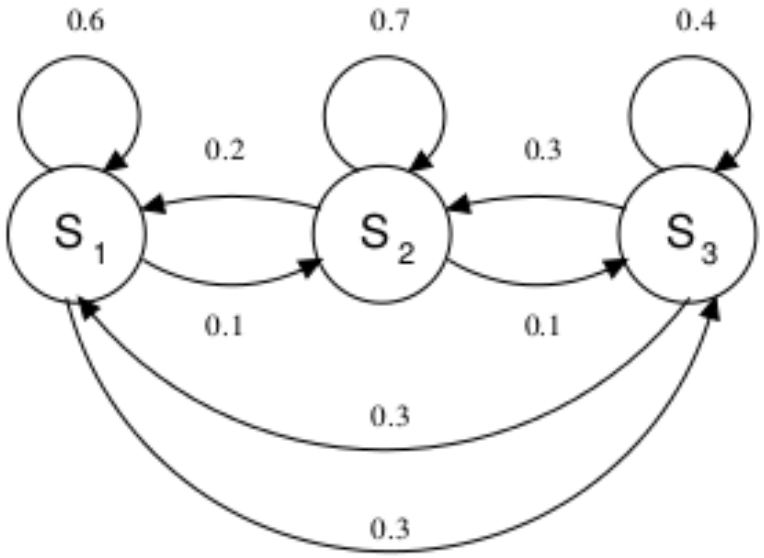
Exercise: n-step calculation

(2/2 points)

Consider the following transition probability graph:



Calculate the three-step transition probability $r_{11}(3)$ by using the recursion formula

$$r_{ij}(n) = \sum_{k=1}^{3} r_{ik}(n-1)p_{kj}.$$

0.419 ✔

$r_{11}(3) =$ **Answer:** 0.419

Answer:
We first calculate the 2-step transition probabilities $r_{1k}(2)$:

$$\begin{aligned} r_{11}(2) &= p_{11}p_{11} + p_{12}p_{21} + p_{13}p_{31} \\ &= (0.6)(0.6) + (0.1)(0.2) + (0.3)(0.3) \\ &= 0.36 + 0.02 + 0.09 \\ &= 0.47, \\ r_{12}(2) &= p_{11}p_{12} + p_{12}p_{22} + p_{13}p_{32} \\ &= (0.6)(0.1) + (0.1)(0.7) + (0.3)(0.3) \\ &= 0.06 + 0.07 + 0.09 \\ &= 0.22, \\ r_{13}(2) &= p_{11}p_{13} + p_{12}p_{23} + p_{13}p_{33} \\ &= (0.6)(0.3) + (0.1)(0.1) + (0.3)(0.4) \\ &= 0.18 + 0.01 + 0.12 \\ &= 0.31. \end{aligned}$$

Using these 2-step transition probabilities, we can then calculate the desired 3-step transition probability:

Exercises 25 due May 18, 2016 at 23:59 UTC

Lec. 26: Absorption probabilities and expected time to absorption
Exercises 26 due May 18, 2016 at 23:59 UTC

Solved problems

Problem Set 10
Problem Set 10 due May 18, 2016 at 23:59 UTC

$$\begin{aligned} r_{11}(3) &= r_{11}(2)p_{11} + r_{12}(2)p_{21} + r_{13}(2)p_{31} \\ &= (0.47)(0.6) + (0.22)(0.2) + (0.31)(0.3) \\ &= 0.419. \end{aligned}$$

You have used 1 of 2 submissions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