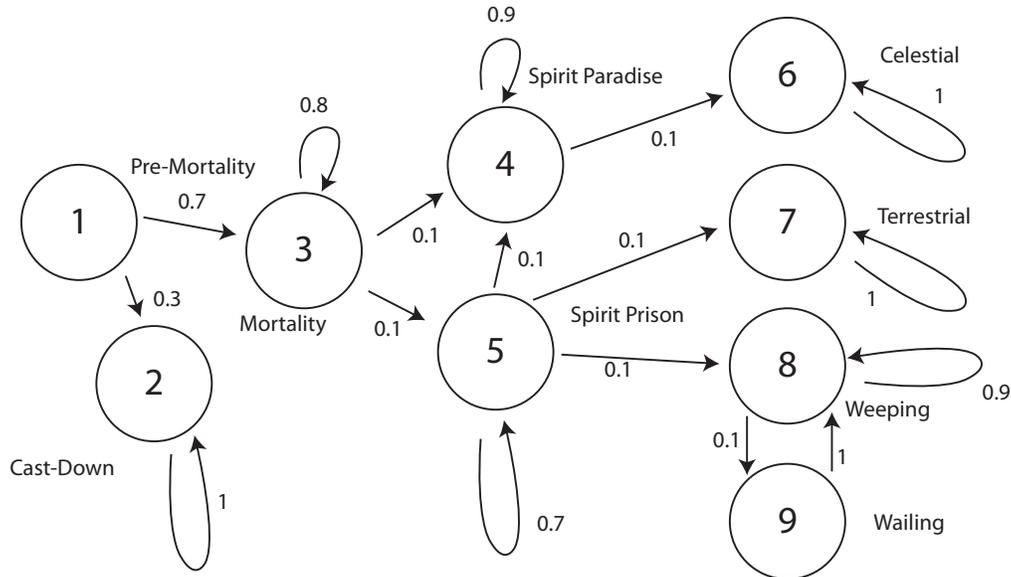


ECEn 370

Quiz 13 Solutions (The Last One!)

Friday, April 9, 2010.



- The above Markov chain represents our progression through life with particular transition probabilities.
 - How many accessible states are there from state 1? 8 (all but 1)
 - How many accessible states are there from state 9? 2 (8 and 9)
 - How many recurrent states are there? 5 (2, 6, 7, 8, 9)
 - How many transient states are there? 4 (1, 3, 4, 5)
 - How many recurrent classes are there? 4 ($\{2\}$, $\{6\}$, $\{7\}$, $\{8, 9\}$)
- Given that you are in the Weeping/Wailing class, what is the probability that at any time you are Weeping?

$$\begin{aligned}\pi_8 + \pi_9 &= 1 \\ \pi_8 &= \pi_8 p_{88} + \pi_9 p_{98} = 0.9\pi_8 + \pi_9 \\ 0.1\pi_8 &= \pi_9 \\ \pi_8 + 0.1\pi_8 &= 1 \\ \pi_8 &= \frac{10}{11}\end{aligned}$$

- Given that a person is in mortality, what is the probability they end up in the terrestrial class?

$$\begin{aligned}a_7 &= 1 \\ a_{10} &= 0 \\ a_4 &= 0 \\ a_5 &= p_{55}a_5 + p_{54}a_4 + p_{57}a_7 + p_{58}a_8 = 0.7a_5 + 0.1 \\ a_5 &= \frac{1}{3} \\ a_3 &= p_{35}a_5 + p_{33}a_3 = 0.1a_5 + 0.8a_3 \\ 0.2a_3 &= 0.1a_5 \\ a_3 &= \frac{1}{2}a_5 = \frac{1}{6}\end{aligned}$$