EXAM MLC QUESTIONS OF THE WEEK

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Week of April 16/07

A homogeneous Markov chain $\{X_n : n \geq 0\}$ has states 0,1,2. The one-step transition probability matrix is $\boldsymbol{Q} = \begin{bmatrix} 0 & \frac{1}{3} & \frac{2}{3} \\ \frac{2}{3} & \frac{1}{3} & 0 \\ 0 & 1 & 0 \end{bmatrix}$.

Find the probability $P((X_3 = 2) \cap (X_2 \neq 0) \cap (X_1 \neq 0) | X_0 = 1)$

The solution can be found below.

Week of April 16/07 - Solution

This probability is 0 since if $X_0 = 1$, then X_1 must be 0 or 1, so in order to avoid state 0 we must have $X_1 = 1$, then we must have $X_2 = 1$, but the one-step transition probability from state 1 to state 2 is 0.