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Courses » Advanced Topics in Probability and Random Processes

Announcements Course Ask a Question Progress Mentor FAQ

Unit 7 - Week 6:Discrete Time Markov Chain

Course outline

Assignment 6

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2018-09-19, 23:59 IST.

1) let $\{X_n\}$ be a homogeneous Markov chain with the state space $V=\{0,1\}$. ***1 point***
If $P(X_{n+1}=0/X_n=0)=0.4$ and $P(X_{n+1}=1/X_n=1)=0.3$, then the translation probability matrix of the chain is

- $P=\begin{bmatrix}0.4 & 0.6\\ 0.7 & 0.3\end{bmatrix}$
- $P=\begin{bmatrix}0.6 & 0.4\\ 0.7 & 0.3\end{bmatrix}$
- $P=\begin{bmatrix}0.4 & 0.6\\ 0.3 & 0.7\end{bmatrix}$
- $P=\begin{bmatrix}0.4 & 0.6\\ 0.3 & 0.4\end{bmatrix}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$P=\begin{bmatrix}0.4 & 0.6\\ 0.7 & 0.3\end{bmatrix}$

2) Let $\{X_n\}$ is a homogeneous Markov chain with the state space $V=\{0,1,2\}$ and state ***1 point***
transition probability $p_{i,j}, i=0,1,2, j=0,1,2$. Using the Chapman Komogorov equation, the 2-step transition probability $p_{1,2}^{(2)}$ can be expressed as

Week 7: Continuous Time Markov Chain

Week 8: Martingle Process

New Unit

Assignment Solutions

$p_{1,2}^{(2)} = p_{1,0}p_{0,2} + p_{1,1}p_{1,2} + p_{1,2}p_{0,2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$p_{1,2}^{(2)} = p_{1,0}p_{0,2} + p_{1,1}p_{1,2} + p_{1,2}p_{2,2}$

3) Which of the following matrices are not stochastic? *1 point*

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{2} & \frac{1}{3} & 0 \\ \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ 1 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{2} & \frac{1}{3} & \frac{1}{6} \\ \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ 1 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{2} & \frac{1}{3} & 0 \\ \frac{1}{2} & \frac{1}{3} & \frac{1}{4} \\ 1 & 0 & 0 \end{bmatrix}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$\begin{bmatrix} \frac{1}{2} & \frac{1}{3} & 0 \\ \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ 1 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{2} & \frac{1}{3} & 0 \\ \frac{1}{2} & \frac{1}{3} & \frac{1}{4} \\ 1 & 0 & 0 \end{bmatrix}$$

4) Consider a 4-state Markov chain with the transition probability matrix $P = \begin{bmatrix} 0 & 1 & 0 & 0 \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ \frac{1}{3} & \frac{1}{3} & 0 & \frac{1}{3} \\ \frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4} \end{bmatrix}$. The largest eigen value of P is *1 point*

- 1
- 2
- 3
- 4

No, the answer is incorrect.
Score: 0

Accepted Answers:

1

5) Suppose $\lambda = 1$ is a distinct eigen value of a 3×3 transition matrix P. The corresponding eigen vector is **1 point**

- $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$
- $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$
- $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$
- $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

6) Consider an independent increment process $\{W(t), t \geq 0\}$ where the increment $W(t+s) - W(t)$ is normally distributed. $\{W(t), t \geq 0\}$ is an example of a **1 point**

- Discrete-time discrete state Markov process
- Discrete-time continuous state Markov process
- Continuous-time continuous state Markov process
- Continuous-time discrete state Markov process

No, the answer is incorrect.
Score: 0

Accepted Answers:
Continuous-time discrete state Markov process

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