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-Kolmogorov equation, the 2-step transition probability \( p_{1,2}^{(2)} \) can be expressed as
Consider a 4-state Markov chain with the transition probability matrix $P^{(2)} = P_{1,0}P_{0,2} + P_{1,1}P_{1,2} + P_{1,2}P_{0,2}$.

3) Which of the following matrices are not stochastic?

No, the answer is incorrect.
Score: 0

Accepted Answers:

\[
\begin{bmatrix}
1 & 0 & 0 \\
0 & 1 & 0 \\
1 & 0 & 0
\end{bmatrix}
\]

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

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

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

No, the answer is incorrect.
Score: 0

Accepted Answers:

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 eigenvalue of $P$ is

No, the answer is incorrect.
Score: 0

Accepted Answers:
5) Suppose $\lambda = 1$ is a distinct eigen value of a $3 \times 3$ transition matrix $P$. The corresponding eigen vector is

$$
\begin{pmatrix}
0 \\
0 \\
1
\end{pmatrix}$$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$$
\begin{pmatrix}
1 \\
1 \\
1
\end{pmatrix}
$$

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

- 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