Unit 5 - week 3

Assignment 3

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

Due on 2019-08-21, 23:59 IST.

Each of the following questions has four options out of which one or more options can be correct. Individual marks are mentioned corresponding to each questions. In case of multiple answers partial marks will be awarded for every correct option chosen provided no incorrect option have been chosen. 0 marks are awarded for questions not attempted.

1) Classify the following stochastic process based on the state space and index set. The number of individuals in a population at the end of each year. **2 points**

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
Discrete time discrete state stochastic process

2) Classify the following stochastic process based on the state space and index set. Number of incoming calls in an interval [0,t]. **2 points**

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
Continuous time discrete state stochastic process

3) **2 points**

Classify the following stochastic process based on the state space and index set. Share price of an asset at the close of trading on each day.

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
Discrete time continuous state stochastic process

4) Classify the following stochastic process based on the state space and index set. The number of particles emitted by a certain radioactive material undergoing radioactive decay during a certain period. **2 points**

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
Continuous time discrete state stochastic process

5) Let $\{N(t), t \geq 0\}$ be a Poisson Process with parameter λ. Let T_1 be the time of the first arrival. Then, variance of T_1 is given by **2 points**

- λ
- λT
- $\frac{1}{\lambda^2}$
- $\frac{1}{\lambda}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{1}{\lambda^2}$

6) Consider a simple symmetric random walk model. Let $Z_1, Z_2, \ldots$ be independent and identically distributed random variables with $P(Z_i = 1) = 0.5$ and $P(Z_i = -1) = 0.5$.
Define $S_n = \sum_{i=1}^{n} Z_i$. Then $\lim_{n \to \infty} P(S_n > n)$ equals **2 points**

- 0.25
- 1
- 0
- 0.5

No, the answer is incorrect.
Score: 0
Accepted Answers:
0

7) Consider a simple symmetric random walk model. Let $X_1, X_2, \ldots$ be independent and identically distributed random variables with $P(X_i = 1) = 0.5$ and $P(X_i = -1) = 0.5$.
Define $S_n = \sum_{i=1}^{n} X_i$. The value of the probability $P(S_5 = 4 \mid X_0 = 1)$ is equal to **2 points**

- $\frac{5}{2^5}$
- $\frac{1}{2^5}$
- 0
- $\frac{4}{2^5}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{5}{2^5}$

8) Consider a simple symmetric random walk model. Let $X_1, X_2, \ldots$ be independent and identically distributed random variables with $P(X_i = 1) = 0.5$ and $P(X_i = -1) = 0.5$.
Define $S_n = \sum_{i=1}^{n} X_i$. The value of the probability $P(S_7 = 6 \mid S_2 = 1)$ is equal to **2 points**

- $\frac{5}{2^5}$
- $\frac{1}{2^5}$
- 0
- $\frac{4}{2^5}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{1}{2^5}$

9) Let $\{X_n, n = 0, 1, 2, \}$ be a DTMC with state space $\Omega = \{0, 1\}$ and one-step transition probability matrix $P = \begin{pmatrix} 0.4 & 0.6 \\ 0.3 & 0.7 \end{pmatrix}$ Let initial distribution be $\pi = (0.5, 0.5)$. Then, the value of the probability $P(X(2) = 1)$ is equal to **0 points**

- 0.667
- 0.5
- 0.665
- 0.65

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.665