

## Unit 4 - Week 2

Course outline
How does an NPTEL online course work?
Week 0
Week 1
Week 2
<input type="radio"/> Gaussian Integration, Central Limit Theorem <input type="radio"/> Elementary Theory of Stochastic Processes <input checked="" type="radio"/> Evolutionary Equations of Stochastic Processes <input type="radio"/> Brownian Motion <input type="radio"/> Diffusion Equation <input type="radio"/> Quiz : Assignment 2 <input type="radio"/> Solution : Assignment 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Download Videos
FFEEEDBACK

## Assignment 2

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

**Due on 2020-09-30, 23:59 IST.**

- 1) Let  $X_1, X_2, \dots, X_n$  be  $n$  independent identically distributed random variables each with mean  $\mu$  and standard deviation  $\sigma$ . Then the variable 1 point

$$S_n = \lim_{n \rightarrow \infty} \frac{\frac{1}{n} \sum_{i=1}^n X_i - \mu}{\sigma/\sqrt{n}} \text{ is } \blacksquare$$

- Normally distributed as  $N(0,1)$ ;  
 Uniformly distributed with a mean of 0 and a variance of 1  
 The natural logarithm of the determinant of a diagonal matrix is equal to the trace of the natural logarithm of the same matrix i.e.  $\ln \det A = \text{Tr} \ln A$ ;  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Normally distributed as  $N(0,1)$ ;

- 2) Which of the following is not true? 1 point

- A real symmetric matrix can be diagonalized;  
 The determinant of a matrix is equal to the product of its eigenvalues;  
 The natural logarithm of the determinant of a diagonal matrix is equal to the trace of the natural logarithm of the same matrix i.e.  $\ln \det A = \text{Tr} \ln A$ ;  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
None of the above

- 3) A particle executes scaled Brownian motion with drift in one dimension. The drift rate per unit time is 0.0001 units. The variance rate is 0.01. The probability of the particle being more than 2 units away from its initial position (origin) after 2500 units of time is closest to: 1 point

- 0.6896  
 0.3456  
 0.8412  
 0.3104

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0.6896

- 4) A project consists of two unrelated activities X and Y in sequence. The completion time of X is normally distributed with a mean of 8 days and a standard deviation of 5 days and that of Y is also normally distributed with a mean of 12 days and standard deviation of 6 days. The probability that the project will be completed in 16 days or less is closest to: 1 point

- 0.3005  
 0.3093  
 0.6951  
 0.3050

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0.3050

- 5) A company XYZ Ltd uses three methods for the collection of delinquent receivables. From past records, it is observed that 70% of the accounts are called on personally, 20% are phoned and 10% are sent a letter. The probability of collecting an overdue amount from an account with the three methods are 0.75, 0.60 and 0.65 respectively. The company has just received a payment from a past due account. The probability that the account was called on personally is: 1 point

- 0.7394  
 0.7295  
 0.7355  
 0.7425

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0.7394

- 6) A company is considering upgrading its computer system and a major portion of the upgrade is a new operating system. The company has asked an engineer for an evaluation of the operating system. Suppose the probability of a favorable evaluation is 0.65 and the probability that the company will upgrade its operating system given a favorable evaluation is 0.85, the probability that the company will upgrade and receive a favorable evaluation is: 1 point

- 0.5432  
 0.5610  
 0.5525  
 0.5315

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0.5525

- 7) A retail business store, ABC, is considering the effect on its business of a new retail store, XYZ, which has opened just down the road. Currently (of the total market shared between ABC and XYZ), ABC has 80% of the market and XYZ has 20%. Analysis over the last week has indicated the following probabilities for customers switching the stores they shop at each week: From ABC in week 1 to ABC in week 2: 0.75 From ABC in week 1 to XYZ in week 2: 0.25 From XYZ in week 1 to ABC in week 2: 0.55 From XYZ in week 1 to XYZ in week 2: 0.45 The long-run steady state prediction for the expected market share for ABC is: 1 point

- 0.3025  
 0.1875  
 0.4125  
 0.6875

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0.6875

- 8) Variables X and Y follow generalized Wiener processes, with drift rates a and b and variance rates of s and t. The changes in X and Y in any short interval of time are uncorrelated. Variance rate of the process X + Y is: 1 point

- s+t  
 (s+t)T  
 a+b  
 None of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
s+t

- 9) Suppose that the acceptability of a consumer product in a city is studied. After examining several years of data, it was found that 30% of the people who regularly use the product in year 1 do not do the same in year 2. Also it was found that 20% of the people who do not use the product in year 1, begin to use it regularly year 2. If 5000 people use the product and 10,000 do not in a given year, then the number of consumers who will use the product in year 3 from now is: 1 point

- 5,500  
 5,750  
 9,500  
 None of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
5,750

- 10) The expected value of  $3Z^2$  where Z is normally distributed as  $N(0,1)$  is: 1 point

- 0  
 6  
 9  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
None of the above