REPRESENTATION AND ANALYSIS OF RANDOM SIGNALS (DC-11)

Tutorial-1

Q1. Explain Conditional Probability .

Q2. Explain Total Probability and Bayes theorem.

Q3. A Box contains m white balls and n black balls . balls are drawn at random one at a time without replacement . find the probability of encountering a white ball by the k^{th} draw.

Q4. A Box contains three white balls w1, w2 and w3 and two red balls r1 and r2 . We remove at random two balls in succession . what is the probability that the first removed ball is white and the second is red .

Q5. A Box contains white and black balls .when two balls are drawn without replacement , suppose the probability that both are white is 1/3 .

(a) Find the smallest no of ball in the box.
(b) How small can the total no of balls be ,if black balls are even in numbers.

Q6. A Box B1 contains 10 white and 5 red balls and a box B2 contains 20 white and 20 red balls . A ball is drawn from each box . what is the probability that the ball from B1 will be white and the ball from B2 red.

Q7. A pair of dice is rolled n times .

(a)Find the probability that “even” will not show at all .

(b)Find the probability of obtaining double six at least once.

Q8. A pair of dice is rolled 50 times . find the probability of obtaining “double six” at least three times .

Q9. A pair of fair dice is rolled 10 times . find the probability that “seven” will show at least once.

Q10. A pair of dice is rolled n times.

(a)Find the probability that “even” will not show at all.

(b)Find the probability of obtaining double six at least once.

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Tutorial-2

Q1. Define Probability Distribution function and explain its properties.

Q2. Explain the followings.

(a) Normal Distribution function.
(b) Gamma Distribution function.
(c) Exponential distribution function .

Q3. Write a short notes on followings.

(a) Beta Distribution function.
(b) Uniform Distribution Function.
(c) Bernoulli Distribution function.

Q4. Define probability density function and explain its properties.

Q5. Write short notes on followings.

(a) Poisson distribution function.
(b) Binomial distribution function.
(c) Geometric distribution function .

Q5. A fair coin tossed 1000 times . find the probability p_a that heads will show 500 timess and the probability p_b that heads will show 510 times.

Q6. Explain the Poisson distribution.

Two teams A and B play a series of at most five games. The first team to win three games wins the series. Assume that the outcomes of the games are independent.

(i) find the probability A wins in exactly four games.
(ii) find the probability A wins in exactly four games or less.

Q7. Differentiate discrete-type random variables from continuous type random variables. Explain the random variables g(x) and also write the distribution function of g(x). Determine fy(y) for $y=x^2$.

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Tutorial-3

Q1. Discuss variance of random variable X .

Q2. Write a short note on following .

(a)Mean of a random variable g(x) .

(b) Characteristics function .

(c) Moment generating function .

Q3. Explain Joint Distribution function and its properties.

Q4. If Z= X+Y ; Determine the p.d.f, $f_z(z)$.

Q5. If Z=X-Y ; Determine the p.d.f , $f_z(z)$.

Q6. If Z=XY ; Determine the p.d.f , $f_z(z)$.

Q7. If Z= X/Y ; Determine the p.d.f , $f_z(z)$.

Q8. If Z= X^2+Y^2 ; Determine the p.d.f , $f_z(z)$.

Q9. Explain the function of one random variable.

Derive the expression for Fy(y) for y=ax+b

(i) a>0 (ii) a<0

Q10. Let x and y be independent exponential random variable write common parameter λ. Define u=x+y, v=x-y. Find the joint and marginal p.d.f. of u and v.

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Tutorial-4

Q1. Explain the followings.

(a) Markov process .
(b) Shot noise process.
(c) Poisson process.

Q2. What is Stochastic process ? Explain in detail.

Q3. Explain the Stationary process.

Q4. Classify the stationary processes.

Q5. What is Ergodic process ?

Q6. Discuss Auto Correlation function .

Q7. Write short notes:

(i) Weiner- Levy process

(ii) Narrow band process