銘傳大學九十一學年度資訊傳播工程研究所碩士班招生考試

第四節

機率 試題

Institute-Entrance Examination: Probability (90)

1. (25%) Suppose that the joint density function of x and y is given by

$$f(x,y) = \frac{e^{-x/y}e^{-y}}{y}, \quad 0 < x < \infty, \ 0 < y < \infty$$

   (a) Compute P{x < y}?

   (b) E(x | y = y)?

2. (20%) Let x ~ U(0, 1), let λ be a given positive number, add let y = -(1/ λ)ln x.What is the cumulative distribution of y? and Ey? What is the name of the distribution of y?

3. (20%) A table is ruled with equidistant parallel lines a distance D .apart. A needle of length L, where L $\leqq$ D, is randomly thrown on the table. What is the probability that the needle will intersect one of the lines? (Hint: let x be the distance from the middle point of the needle to the nearest parallel line, and the angle Θ between the needle and the projected line of length x)

4. (15%) Suppose that a biased coin that lands on heads with probability p is flipped 10 times. Given that a total of 7 heads result, find the conditional probability that the first 4 outcomes are T, H, T, H (meaning that the first flip is a tail, the second is a head, the third is a tail and the last is a head)?

5. (20%) Suppose that if a signal value s is sent from location A, then the signal value received at location B is normally distributed with parameters (s, 1). If S, the value of the signal sent at A, is normally distributed with parameters (μ, σ^2), what is the "best" estimate of the signal sent if R, the value received at B, is equal to r?

試題完