EE3060 Probability – Proposed questions and answers

Question 1:

Let X and Y be random variables with finite expectations. Show that if P(X≦Y)=1, then E(X) ≦ E(Y).

Answer 1:



Question 2:

Using MGFs prove that if X∼Binomial(m,p) and Y∼Binomial(n,p) are independent, then X+Y∼Binomial(m+n,p).

Answer 2:



Question 3:

Let be a random number from 0 to. be random variables, please prove that X and Y are uncorrelated.

Answer 3:

The PDF of is given by

 Therefore,

 Thus .

 Uncorrelated.

Question 4:

Let X,Y and Z be three jointly continuous random variables with joint PDF

 =0 , otherwise

1. Find the constant c.
2. Find the marginal PDF of X.

Answer 4:





Question 5:

Cards are drawn from an ordinary deck of 52, one at a time, randomly and with replacement. Let X and Y denote the number of draws until the first ace and the first king are drawn, respectively. Find E(X|Y=5).

Answer 5:

