

ECE 302 Homework 9
COMER

Topics: Independent random variables, functions of two random variables

1. Two people decide to meet at a certain location. If the arrival times of the two people are independent and uniformly distributed between 12:00 noon and 1:00 pm, find the probability that the first to arrive has to wait longer than 10 minutes.
2. Let X and Y be zero-mean, unit-variance independent Gaussian random variables. Find the value of r for which the probability that (X, Y) falls inside a circle of radius r is $1/2$.
3. The random variables X and Y have the joint pdf

$$f_{XY}(x, y) = e^{-(x+y)}$$

for $0 < y < x < 1$. Find the pdf of $Z = X + Y$.

4. The joint density function of X and Y is given by

$$f_{XY}(x, y) = e^{-(x+y)}$$

for $x > 0, y > 0$. Find the density function of the random variable $Z = X/Y$.

5. Let X and Y be independent random variables that are uniformly distributed in the interval $[0, 1]$. Find the pdf of $Z = XY$.
6. Random variables X and Y are independent. X is exponentially distributed with mean 1 and Y is exponentially distributed with mean 1. Find the cdf of $Z = |X - Y|$.