INTRODUCTORY MATHEMATICAL STATISTICS (STAT2001/6039)

Tutorial 8

Problem 1

Two construction contracts are to be randomly assigned to three firms. A firm may receive more than one contract. Numbering the firms I, II and III, let X be the number of contracts assigned to Firm I, and Y the number assigned to Firm II.

(a) Find the joint probability distribution of X and Y (create a table).

(b) Find and sketch the marginal probability distributions of X and Y.

(c) Find the conditional probability distribution of X given that $Y = 0$.

(d) Find the probability that Firm I gets at least one contract given that Firm II gets none.

(e) Find the covariance and correlation between X and Y.

Problem 2

Suppose that two continuous random variables X and Y have joint pdf

$$f(x,y) = kx,\ \ 0 < x < 2, 0 < y < 1, 2y < x.$$

(a) Find k and sketch the joint pdf in two dimensions. **(b)** Find $P(X > 3Y)$.

(c) Find and sketch the marginal pdf's of X and Y.

(d) Find the conditional distribution of Y given that $X = x$.

(e) Find the probability that Y exceeds 1/8 given that X equals 1.