INTRODUCTORY MATHEMATICAL STATISTICS (STAT2001/6039)

Tutorial 10

Problem 1

(a) Suppose that Y has the exponential distribution with mean 2.

Find and sketch the pdf of $U = \sqrt{Y}$.

(b) Suppose that X is uniformly distributed from 0 to 2.

Find and sketch the pdf of $V = X(2 - X)$.

Then compute EV.

Problem 2

Consider two independent random variables X and Y, where X has the standard uniform distribution and Y has the standard exponential distribution.

Derive and sketch the pdf of $U = X + Y$.

Problem 3

Two points are randomly and independently located along a stick of length 1 m.

(a) Find the expected distance between the two points.

(b) Find the expected distance from the left end of the stick to the point which is closest to that end.

(c) Find the expected distance from the left end of the stick to the first of the two points, given that that point is closer to the left end than to the right end.

Problem 4

Let X and Y be the number of accidents which will occur at each of two intersections over the next year.

Suppose that X and Y may be considered as independent Poisson random variables, with means a and b, respectively.

(a) Derive the pdf of the total number of accidents which will occur at the two intersections over the next year.

(b) Find the conditional distribution of the number of accidents which will occur at the first intersection over the next year, given the total number of accidents.