MATH 323 - Tutorial 10 Questions

Tyrel Stokes

Email tyrel.stokes@mail.mcgill.ca for any questions about these problems.

1. Let $Y \sim U(-1, 1)$. Let $X = Y^2$ be a transformation of Y.

a) Find the pdf of X.

b) What is the covariance of X and Y.

2. Let $f_{Y_1,Y_2}(y_1, y_2) = c(y_1^2 + 2y_1y_2 + y_2^2), \quad 0 < y_1, y_2 < l$ for some positive constants c, l.

a) find the constant c in terms of l.

Let $l = 1$ for the remainder of this question.

b) What is $Cov(Y_1, Y_2)$.

3. Let $f_{Y_1,Y_2} = cy_1y_2, \quad 0 < y_1, y_2 < 2$.

a) Find c such that the above is a valid joint distribution,

b) Find $f_{Y_2}(y_2)$

c) Find $f_{Y_1|Y_2}(y_1|y_2)$

d) Show that Y_1 is independent of Y_2.

e) Find $E[Y_1|Y_2 > 1]$

4. Let $f_Y(y) = \alpha\beta y^{\alpha-1} \exp(-\beta y^\alpha), y > 0$. Y follows the Weibell Distribution. Show that the transformation $U = Y^\alpha$ follows an exponential distribution.