Engineering Mathematics and Statistics (B39AX) Fall 2023

Tutorial 7

Problem A.

Let X and Y be to continuous random variables with joint probability density function defined as

$$f_{X,Y}(x,y) = \begin{cases} c \; if \; x \geq 0, y \geq 0 \; and \; x + 2y \; \leq 1 \\ 0 \; elsewhere, \end{cases}$$

where $c \geq 0$ is a constant

1) Are X and Y independent and why?
2) What is the value of c?
3) Compute the marginal probability density function $f_Y(y)$.
4) What is the expression of $f_{X|Y}(x|y = 0.25)$? More generally, to which family of

Problem B.

Let X and Y be to independent continuous random variables with

$X \sim U(0,1)$ and $Y \sim U(3,5)$.

1) What are the minimum and maximum values of Z?
2) Compute the distribution of $Z = X + Y$.
3) Draw the graph of the probability density function of Z