

# Assignment 4

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Download all python codes from

<https://github.com/Ananthoju-Pranav-Sai/AI1103/tree/main/Assignment%204/Codes>

and latex codes from

<https://github.com/Ananthoju-Pranav-Sai/AI1103/blob/main/Assignment%204/main.tex>

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Let X and Y have joint probability function given by

$$f_{X,Y}(x,y) = \begin{cases} 2 & 0 \leq x \leq 1-y, 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

If  $f_Y$  denotes the marginal probability density function of Y, then  $f_Y(1/2) = ?$

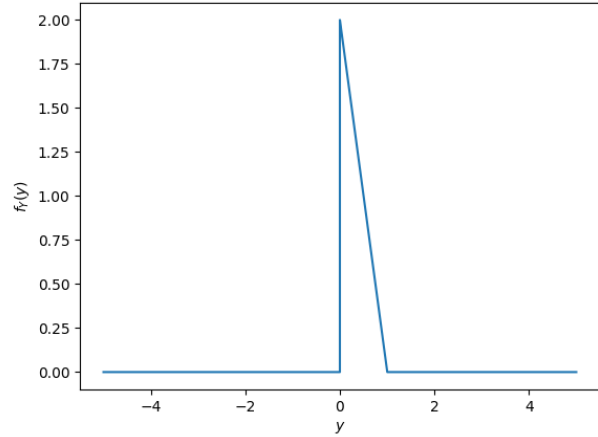
SOLUTION

$$f_Y(y) = \int_{-\infty}^{\infty} f_{X,Y}(x,y).dx \quad (23.1)$$

$$\Rightarrow f_Y(y) = \begin{cases} 0 + \int_0^{1-y} 2.dx & 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases} \quad (23.2)$$

$$\Rightarrow f_Y(y) = \begin{cases} 2(1-y) & 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases} \quad (23.3)$$

$$\therefore f_Y(1/2) = 1 \quad (23.4)$$



**Plot of  $f_Y(y)$  - marginal p.d.f**