ASSIGNMENT 5

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Download all python codes from

https://github.com/manik2255/AI1103-PROBABILITY-AND-RANDOM-VARIABLES/blob/main/ASSIGNMENT%205/assign_5.py

and all latex-tikz codes from

https://github.com/manik2255/AI1103-PROBABILITY-AND-RANDOM-VARIABLES/blob/main/ASSIGNMENT%205/ASSIGNMENT_5.tex

1 GATE 2015 MA PROBLEM.9

Let the random variable X have the distribution function $F(x) = \begin{cases} 0 & if\ x < 0 \\ \frac{x}{2} & if\ 0 \le x < 1 \\ \frac{3}{5} & if\ 1 \le x < 2 \\ \frac{1}{2} + \frac{x}{8} & if\ 2 \le x < 3 \\ 1 & if\ x \ge 3 \end{cases}$

Then $\Pr(2 \le x < 4)$ is equal to

2 SOLUTION

Given,

$$F(x) = \begin{cases} 0 & if\ x < 0 \\ \frac{x}{2} & if\ 0 \le x < 1 \\ \frac{3}{5} & if\ 1 \le x < 2 \\ \frac{1}{2} + \frac{x}{8} & if\ 2 \le x < 3 \\ 1 & if\ x \ge 3 \end{cases} \tag{2.0.1}$$

We need to find $\Pr(2 \le x < 4)$,which is also can be written as

$$\Pr(2 \le x < 4) = \Pr(x < 4) - \Pr(x < 2) \tag{2.0.2}$$
$$= F(X = 4^-) - F(X = 2^-) \tag{2.0.3}$$

Using (2.0.1) in (2.0.3),

$$\Pr(2 \le x < 4) = 1 - \frac{3}{5} \tag{2.0.4}$$
$$= \frac{2}{5} \tag{2.0.5}$$
$$= 0.4 \tag{2.0.6}$$

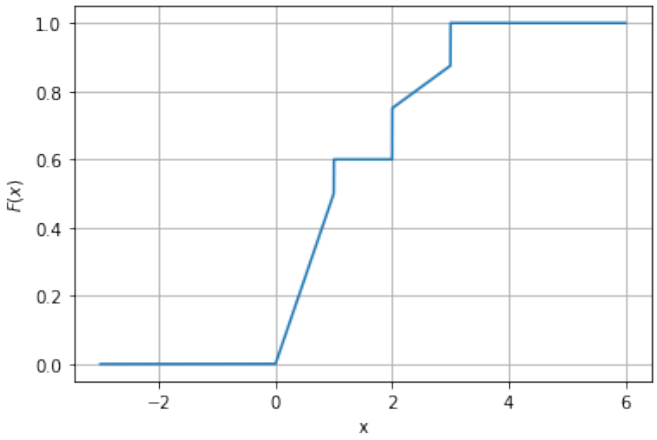

Fig. 1: cdf of random variable X