# Assignment

Anshul Sangrame

CS21BTECH11004

**1.3:** Find a theoretical expression for $F_U(x)$.

**Solution:**

Pdf of Uniform distribution between [0,1] is given by,

$$f_U(x) = \begin{cases} 1, & x \in [0,1] \\ 0, & \text{otherwise} \end{cases} \tag{1}$$

$$F_U(x) = \int_{-\infty}^{x} f_U(x)dx \tag{2}$$

Case-1: x $<$ 0,

$$F_U(x) = \int_{-\infty}^{x} 0dx \tag{3}$$

$$= 0 \tag{4}$$

Case-2: x $\in$ [0,1],

$$F_U(x) = \int_{-\infty}^{0} 0dx + \int_{0}^{x} 1dx \tag{5}$$

$$= x \tag{6}$$

Case-3: x $>$ 1,

$$F_U(x) = \int_{-\infty}^{0} 0dx + \int_{0}^{1} 1dx + \int_{1}^{x} 0dx \tag{7}$$

$$= 1 \tag{8}$$

Hence,

$$F_U(x) = \begin{cases} 0, & x < 0 \\ x, & x \in [0,1] \\ 1, & x > 1 \end{cases} \tag{9}$$