AI1110 Assignment Q-1.3

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

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

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

Hence, If $x \leq 0$,

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

$$F_U(x) = \int_{-\infty}^{x} 0\, dx \tag{4}$$

$$= 0 \tag{5}$$

If $0 < x < 1$,

$$F_U(x) = \int_{0}^{x} f_U(x)\, dx \tag{6}$$

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

$$= x \tag{8}$$

If $x \geq 1$,

$$F_U(x) = \int_{1}^{x} f_U(x)\, dx \tag{9}$$

$$F_U(x) = \int_{1}^{x} 0\, dx \tag{10}$$

$$= 0 \tag{11}$$