GATE: IN 28

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QUESTION: Consider the discrete time signal $x[n] = u[-n+5] - u[n+3]$, where

$$u[n] = \begin{cases} 1; n \geq 0 \\ 0; n < 0 \end{cases}$$

The smallest n for which $x[n] = 0$ is?

Solution: $x(n)$ can be defined as

$$x(n) = h(n) - f(n) \tag{1}$$

Where

$$h(n) = u(-n+5) \tag{2}$$

$$f(n) = u(n+3) \tag{3}$$

Find the values of n for which

$$h(n) = f(n) \tag{4}$$

The values of n are given as

$$n \in [-3, 5]$$

Hence the lowest value of n

$$\boxed{n = -3} \tag{5}$$

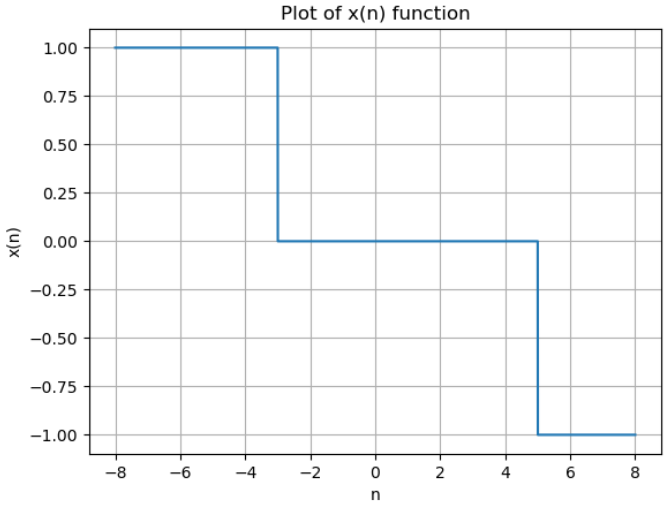

Fig. 1. Plot of function u(n) taken from Python3