

GATE: IN/28

EE23BTECH11040 - Manoj Kumar Ambatipudi*

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

$$x(n) = h(n) - f(n) \quad (1)$$

Where

$$h(n) = u(-n+5) \quad (2)$$

$$f(n) = u(n+3) \quad (3)$$

Find the values of n for which

$$h(n) = f(n) \quad (4)$$

from Fig. 1, the values of n are given as

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

Hence the lowest value of n

$$\boxed{n = -3} \quad (5)$$

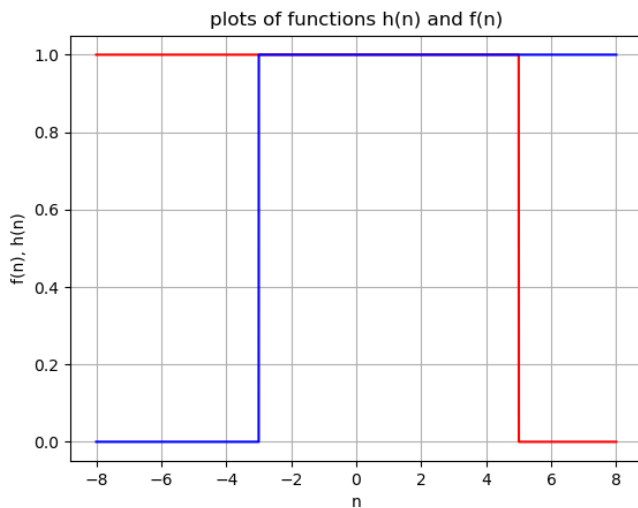


Fig. 1. Plots of $h(n)$, $f(n)$ taken from python3

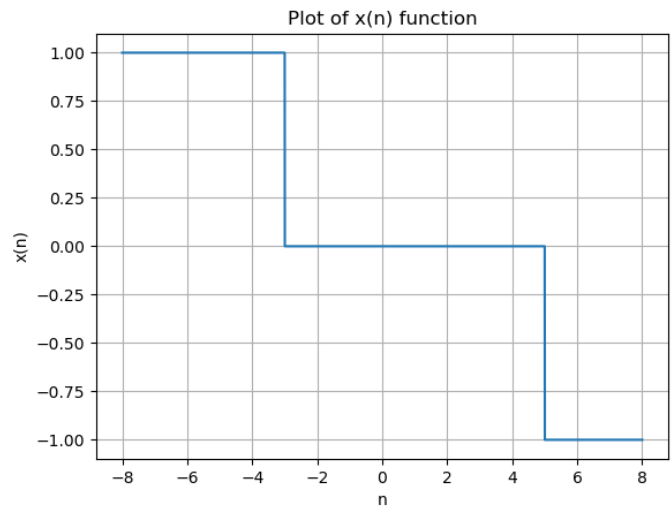


Fig. 2. Plot of function $x(n)$ taken from Python3