

11.9.4.4

EE23BTECH11027 - K RAHUL*

QUESTION:

Find sum to n terms of the following series:

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots \quad (\text{NCERT discrete 11.9.9.4})$$

SOLUTION:

Symbol	Description	Value
$x(n)$	n^{th} term of series	

TABLE 0
PARAMETERS

$$x(n) = \frac{1}{(n+1)(n+2)} u(n) \quad (1)$$

(2)

Using (??),

$$X(z) = z(z-1) \log(1-z^{-1}) + z, \quad |z| > |1| \quad (3)$$

$$y(n) = x(n) * u(n) \quad (4)$$

$$\Rightarrow Y(z) = X(z)U(z) \quad (5)$$

$$= z^2 \ln(1-z^{-1}) + \frac{z^2}{z-1} \quad (6)$$

Using (??) and (??), we get,

$$y(n) = 1 - \frac{1}{n+2} \quad (7)$$

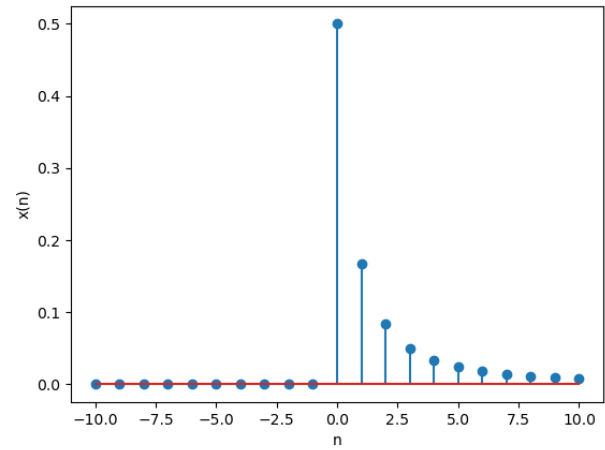


Fig. 0. Stem Plot of $x(n)$ v/s n