11.9.4.4

EE23BTECH11027 - K RAHUL*

QUESTION:

Find sum to n terms of the following series:
$\frac{1}{1\times2} + \frac{1}{2\times3} + \frac{1}{3\times4} + \dots$

SOLUTION:

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

TABLE 0
PARAMETERS

$$x(n) = \frac{1}{(n+1)(n+2)}u(n) \tag{1}$$
$$= (\frac{1}{n+1} - \frac{1}{n+2})u(n) \tag{2}$$
$$\tag{3}$$

Using (**??**)we get,

$$X(z) = -zlog(1-z^{-1}) + z^2log(1-z^{-1}) + z \tag{4}$$
$$= z(z-1)log(1-z^{-1}) + z \tag{5}$$
$$Y(z) = X(z)U(z) \tag{6}$$
$$= z^2log(1-z^{-1}) + \frac{z}{1-z^{-1}} \tag{7}$$
$$\tag{8}$$

Using (**??**) and (**??**),

$$y(n) = 1 - \frac{1}{n+1} \tag{9}$$
$$\tag{10}$$

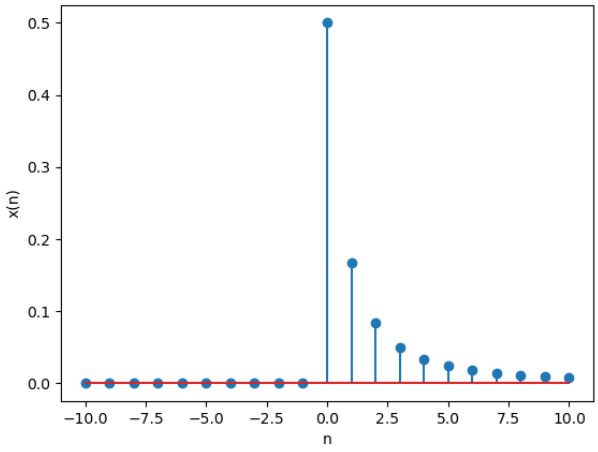

Fig. 0. Stem Plot of $x(n)$ v/s n