

Assignment

11.9.5 - 22

EE23BTECH11220 - R.V.S.S Varun

QUESTION

Find the 20th term in this series.

$$2 \times 4 + 4 \times 6 + 6 \times 8 \cdots + n \text{ terms}$$

Solution:

Symbol	Value	Description
$x(0)$	8	First term of the series
$x(n)$	$4(n+1)(n+2)u(n)$	$(n+1)^{th}$ term of the series

TABLE 0
TABLE OF PARAMETERS

To find 20th term of the series put $n=19$,

$$x(19) = 4 * 20 * 21 \quad (1)$$

$$= 1680 \quad (2)$$

Using Z- transform,

$$n^2 u(n) \xleftrightarrow{Z} \frac{z^{-1}(z^{-1} + 1)}{(1 - z^{-1})^3}, |z| > 1 \quad (3)$$

$$nu(n) \xleftrightarrow{Z} \frac{z^{-1}}{(1 - z^{-1})^2}, |z| > 1 \quad (4)$$

$$u(n) \xleftrightarrow{Z} \frac{1}{(1 - z^{-1})}, |z| > 1 \quad (5)$$

$$X(z) = \sum_{n=-\infty}^{n=\infty} 4(n+1)(n+2)u(n)z^{-n} \quad (6)$$

$$X(z) = \sum_{n=-\infty}^{n=\infty} 4(n^2 + 3n + 2)u(n)z^{-n} \quad (7)$$

$$X(z) = \frac{8}{(1 - z^{-1})^3}, |z| > 1 \quad (8)$$

