

NCERT-discrete : 11.9.3 - 21

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I. QUESTION

Find four numbers forming a geometric progression in which the third term is greater than the first term by 9, and the second term is greater than the 4th by 18.

Solution:

Symbols	Description	Values
r	Common ratio of the GP	-2
$x(n)$	$(n + 1)^{th}$ term of the Sequence	$x(0)r^n u(n)$
$x(0)$	First term of the GP	3

TABLE 0
PARAMETERS, DESCRIPTIONS, AND VALUES

Solving for $x(0), r$:

$$x(0)r^2 - 9 = x(0) \quad (1)$$

$$x(0)r + 18 = x(0)r^3 \quad (2)$$

$$\implies x(0) = 3 \quad (3)$$

$$\implies r = -2 \quad (4)$$

Z-Transform for $x(n)$ Using (??) :

$$X(z) = \sum_{n=-\infty}^{\infty} (3(-2)^n u(n)) z^{-n} \quad (5)$$

$$= \frac{z}{2+z}, \quad |z| > |2| \quad (6)$$

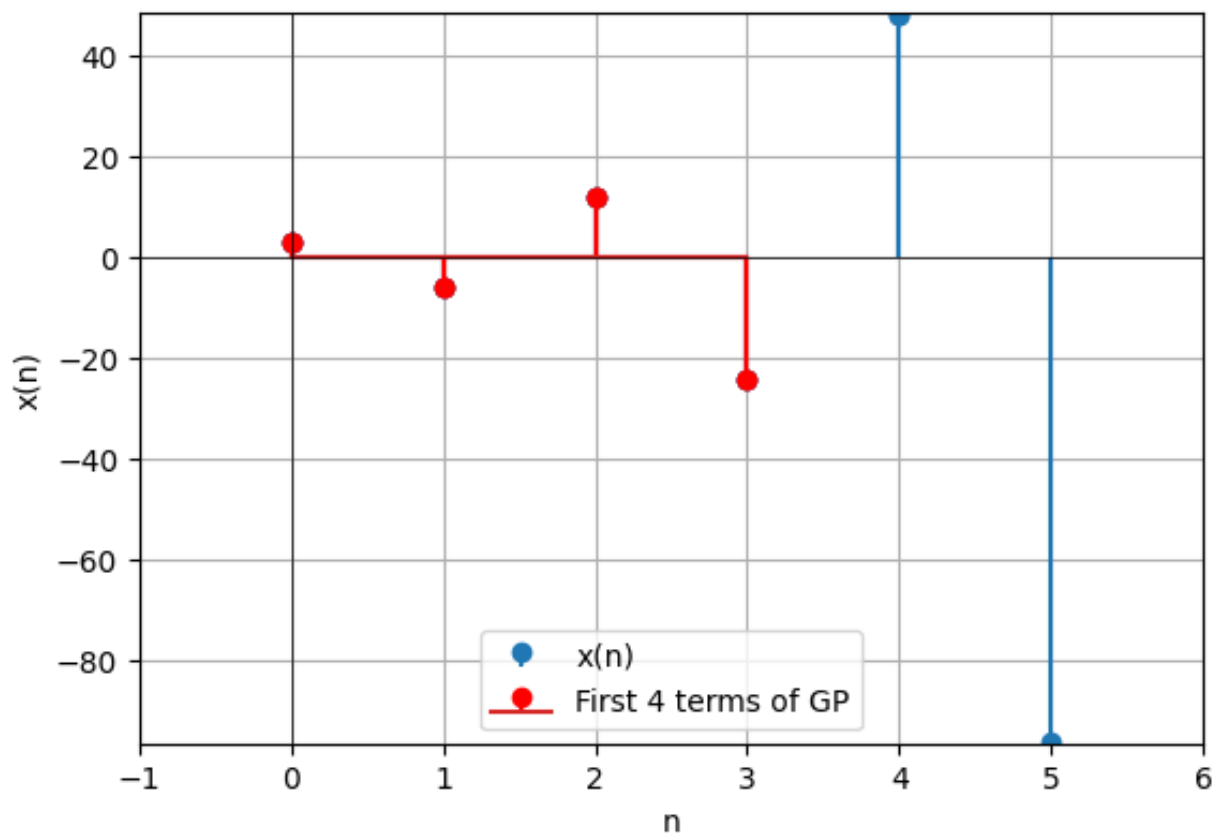


Fig. 0. $x(n)$ vs n