

Assignment

EE23BTECH11001 - Aashna Sahu

Q: Find a GP for which sum of the first two terms is -4 and the fifth term is 4 times the third term.

Solution:

Parameter	Description	Value
$x(0)$	First term of AP	—
r	Common ratio	—
$x(n)$	General term of given AP	—
$x(0) + x(1)$	sum of 1st and 2nd term	-4
$\frac{x(4)}{x(2)}$	Ratio of 5th and 3rd term	4

TABLE 0: Input Parameters

$$x(n) = x(0) \times r^n u(n) \quad (1)$$

$$x(0)r^4 = 4x(0)r^2 \quad (2)$$

$$\Rightarrow r = +2, -2y(n) = x(0) \left(\frac{r^{n+1} - 1}{r - 1} \right) u(n) \quad (3)$$

From Table 0 and eq.(3) :

$$y(1) = x(0) \left(\frac{r^2 - 1}{r - 1} \right) \quad (4)$$

$$-4 = x(0)(r + 1) \quad (5)$$

$$\Rightarrow x(0) = \frac{-4}{r + 1} \quad (6)$$

$$1) \text{ For } r = +2, x(0) = \frac{-4}{3}$$

$$x(n) = \frac{-4}{3} \times (2^n) \quad (7)$$

$$GP_1 : \frac{-4}{3}, \frac{-8}{3}, \frac{-16}{3}, \dots \quad (8)$$

$$2) \text{ For } r = -2, x(0) = 4$$

$$x(n) = 4 \times (-2)^n \quad (9)$$

$$GP_2 : 4, -8, 16, -32, \dots \quad (10)$$

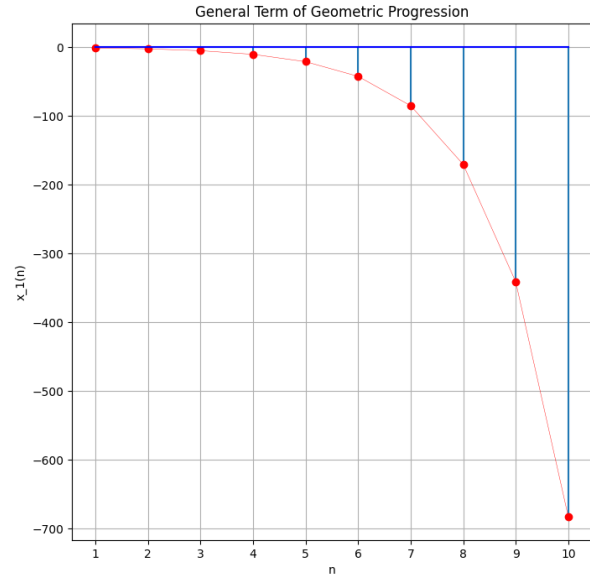


Fig. 2: Representation of $x(n)$ in GP_2

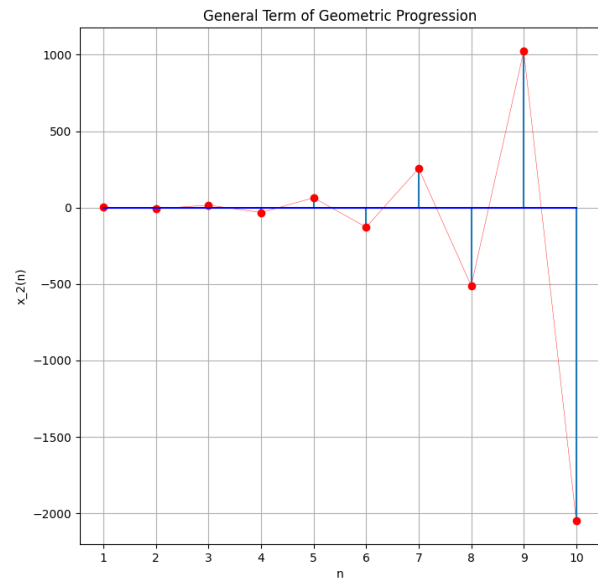


Fig. 2: Representation of $x(n)$ in GP_1