# 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

$$x(n) = x(0) \times r^n u(n) \tag{1}$$

$$x(0)r^4 = 4x(0)r^2 \tag{2}$$

$$\implies r = +2, -2 \tag{3}$$

$$y(n) = x(0)\left(\frac{r^{n+1}-1}{r-1}\right)u(n) \tag{4}$$

From Table 0 and eq.(3) :

$$y(1) = x(0)\left(\frac{r^2-1}{r-1}\right) \tag{5}$$

$$-4 = x(0)(r+1) \tag{6}$$

$$\implies x(0) = \frac{-4}{r+1} \tag{7}$$

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

$$x(n) = \frac{-4}{3} \times (2^n) \tag{8}$$

$$GP_1 : \frac{-4}{3}, \frac{-8}{3}, \frac{-16}{3}, .... \tag{9}$$

2) For $r = -2$ $\quad x(0) = 4$

$$x(n) = 4 \times (-2)^n \tag{10}$$

$$GP_2 : 4, -8, 16, -32, .... \tag{11}$$

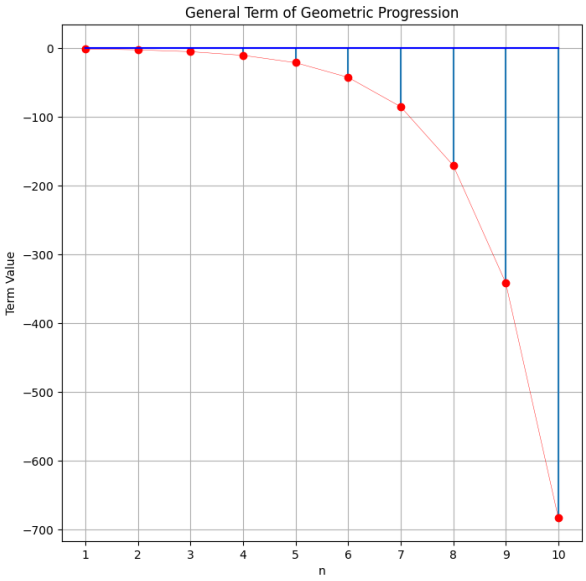


Fig. 2: Representation of x(n) in $GP_2$

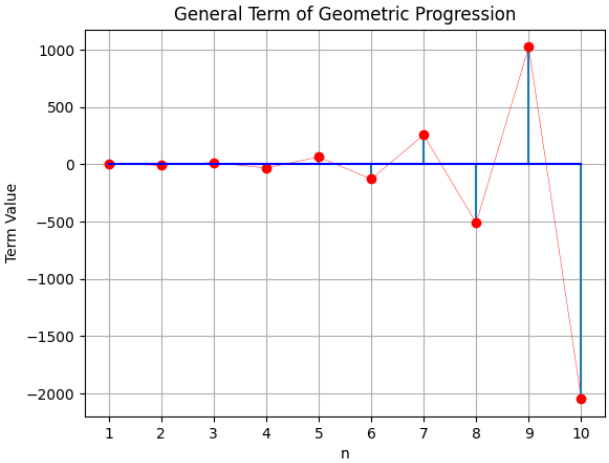


Fig. 2: Representation of x(n) in $GP_1$