# 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 | $x(0)r^n u(n)$ |
| $x(0)+x(1)$ | sum of 1st and 2nd term | $-4$ |
| $\frac{x(4)}{x(2)}$ | Ratio of 5th and 3rd term | 4 |
| $y(n)$ | Sum of first n+1 terms | $x(0)\left(\frac{r^n-1}{r-1}\right)u(n)$ |

TABLE 0: Input Parameters

$$x(0)r^4 = 4x(0)r^2 \tag{1}$$

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

From Table 0 and (2) :

$$y(1) = x(0)\left(\frac{r^2-1}{r-1}\right)u(1) \tag{3}$$

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

$$\implies x(0) = \frac{-4}{r+1} \tag{5}$$

$$x(0) = \begin{cases} \frac{-4}{3}, & r = +2 \\ 4, & r = -2 \end{cases} \tag{6}$$

$$X(z) = \frac{x(0)}{1-rz^{-1}} \quad , |z| > |r| \tag{7}$$

$$X(z) = \begin{cases} \frac{4}{3(2z^{-1}-1)}, & r = +2 \\ \frac{4}{1+2z^{-1}}, & r = -2 \end{cases} \tag{8}$$

$$|z| > 2$$

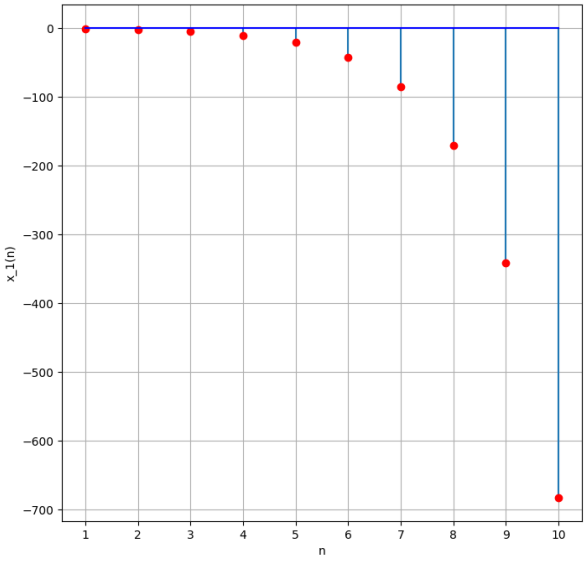


Fig. 0: Representation of x(n) for $r = 2$

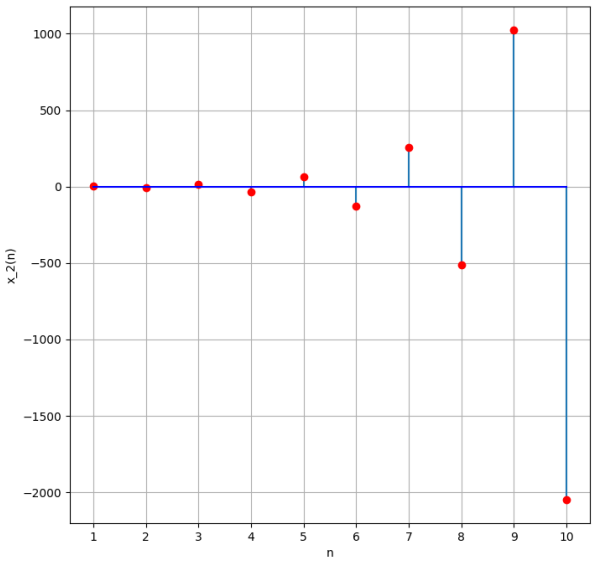


Fig. 0: Representation of x(n) for $r = -2$