

11.9.3.6

EE23BTECH11022 - G DILIP REDDY

Question:

For what values of x , the numbers $-\frac{2}{7}, x, -\frac{7}{2}$ are in G.P ?

Solution:

Let r be the common ratio

From Table 1:

$$\Rightarrow \frac{x}{\left(-\frac{2}{7}\right)} = \frac{\left(-\frac{7}{2}\right)}{x} = r \quad (1)$$

$$x^2 = \left(-\frac{2}{7}\right) \cdot \left(-\frac{7}{2}\right) \quad (2)$$

$$x = \pm 1 \quad (3)$$

$$\Rightarrow r = \pm \frac{7}{2} \quad (4)$$

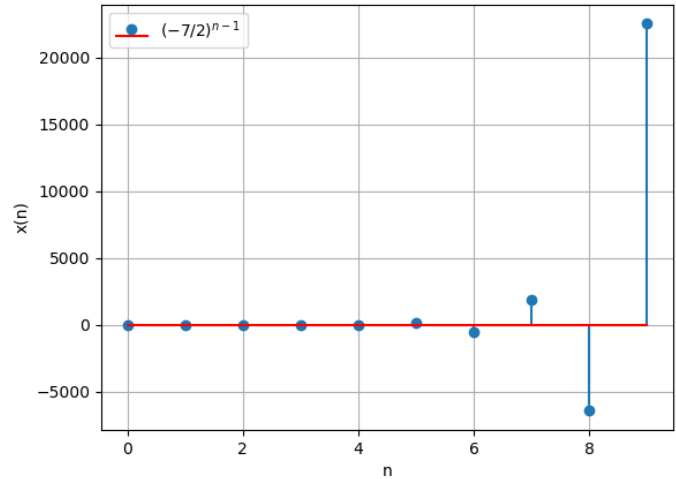


Fig. 1: Stem Plot of $x_1(n)$

The signal corresponding to this is

$$x(n) = \left(-\frac{2}{7}\right) \left(\pm \frac{7}{2}\right)^n u(n) \quad (5)$$

Applying z-Transform :

$$\Rightarrow X_1(z) = \left(\frac{1}{7}\right) \left(\frac{4}{7z^{-1} + 2}\right) \quad |z| > \frac{7}{2} \quad (6)$$

$$\Rightarrow X_2(z) = \left(\frac{1}{7}\right) \left(\frac{4}{7z^{-1} - 2}\right) \quad |z| > \frac{7}{2} \quad (7)$$

Variable	Description	Value
$x(0)$	First term of the GP	$-\left(\frac{2}{7}\right)$
$x(1)$	Second term of the GP	x
$x(2)$	Third term of the GP	$-\left(\frac{7}{2}\right)$
r	Common ratio of the GP	$\pm \left(\frac{7}{2}\right)$
$x(n)$	General term	$x(0) r^n u(n)$

TABLE 1: Variables Used

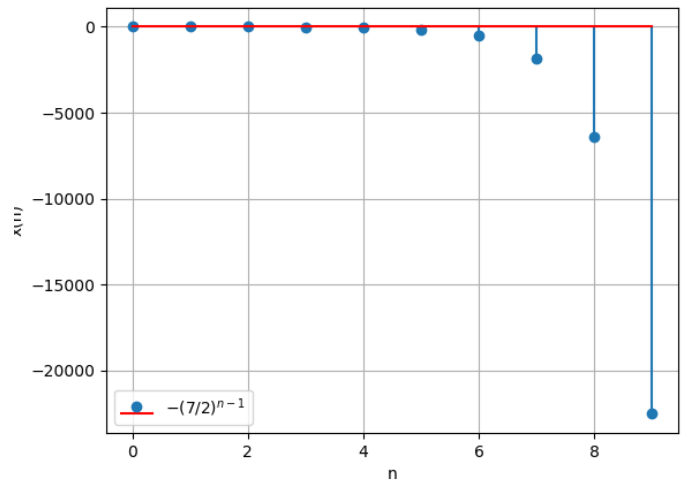


Fig. 2: Stem Plot of $x_2(n)$