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

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	
$x(n)$	General term	$x(0)\,r^n\,u(n)$

TABLE 1: Variables Used

From Table 1:

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

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

$$x = \pm 1 \tag{3}$$

$$\implies r = \pm\frac{7}{2} \tag{4}$$

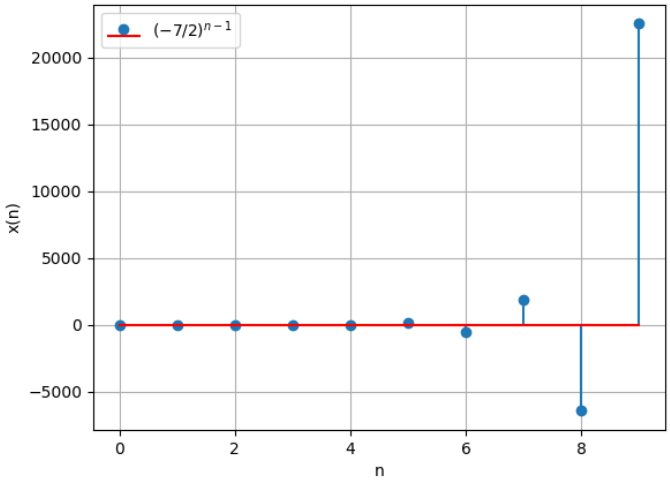

Fig. 1: Stem Plot of x_1(n)

The signal corresponding to this is

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

Applying z-Transform :

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

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

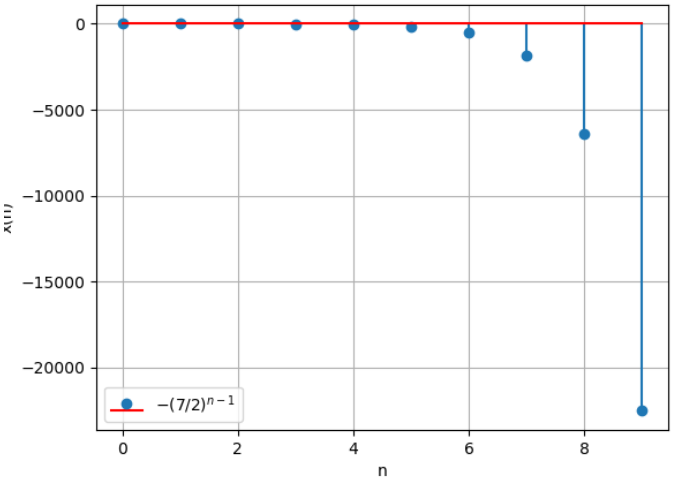

Fig. 2: Stem Plot of $x_2(n)$