NCERT 11.9.3 1Q

EE23BTECH11013 - Avyaaz[*]

Question: Find the 20th and n^{th} terms of the
G.P $\frac{5}{2}$, $\frac{5}{4}$, $\frac{5}{8}$,.....
Solution:

Parameter	Description	Value
$x(0)$	First Term	$\frac{5}{2}$
$r = \dfrac{x(1)}{x(0)}$	Common Ratio	$\frac{1}{2}$
$x(n)$	n^{th} Term	$\frac{5}{2}\left(\frac{1}{2}\right)^{n} \cdot u(n)$
$x(19)$	20th Term	$\frac{5}{2}\left(\frac{1}{2}\right)^{19}$
$u(n)$	Unit step function	

TABLE 1: Parameters

From Table 1: Z-Transform of $x(n)$:

$$\implies X(z) = \frac{5}{2}\left(\frac{1}{1 - \frac{z^{-1}}{2}}\right); \left\{z \in \mathbb{C} : |z| > \frac{1}{2}\right\}$$
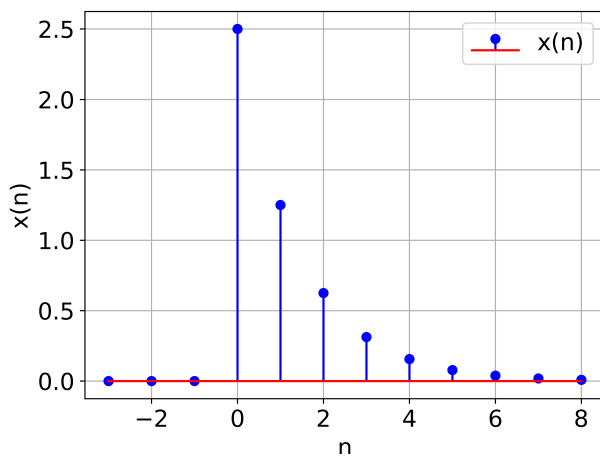
$$(1)$$

Fig. 1