

NCERT Discrete - 10.5.3.20

EE23BTECH1205 - Avani Chouhan*

Parameter	Value	Description
$x(0)$	5	First term
r	2	Common ratio
$y(n)$	315	Sum of terms
n	?	Value of n

TABLE 0
INPUT PARAMETERS

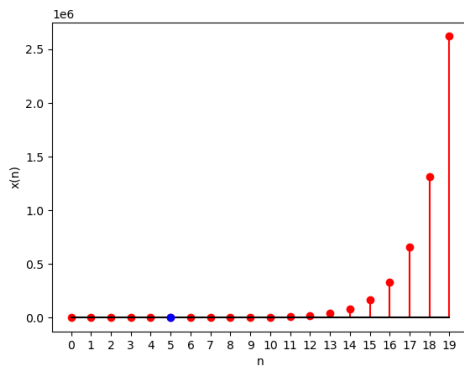


Fig. 0. Stem plot of GP

Question : 10.5.3.20 The sum of some terms of G.P. is 315 whose first term and the common ratio are 5 and 2, respectively. Find the last term and the number of terms.

Solution:

Given:

$$X(z) = \frac{x(0)}{1 - rz^{-1}} \quad (1)$$

By contour integration:

$$y(n) = x(0) \left(\frac{r^{n+1} - 1}{r - 1} \right) u(n) \quad (2)$$

$$\Rightarrow 315 = 5 (2^{n+1} - 1) \quad (3)$$

$$\Rightarrow n = 5 \quad (4)$$

$$x(n) = x(0)r^n u(n) \quad (5)$$

$$\Rightarrow x(5) = 5 (2^5) \quad (6)$$

$$= 160 \quad (7)$$

Therefore, the number of terms is 6, and the last term is 160.