Assignment-2

EE:1205 Signals and systems
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I. Question 1.2.4

How many terms of the AP : 9, 17, 25, . . . must be taken to give a sum of 636?

II. Solution

Parameter	Description	Value
x(0)	First Term	9
d	Common Difference	8
S_n	Sum of n terms	636

TABLE 0
Parameter Table

We know the formula

$$S_n = \frac{(n+1)}{2}[2x(0) + d(n)] \tag{1}$$

Putting in values from the table

$$636 = \frac{(n+1)}{2}[18 + 8n] \tag{2}$$

$$636 = (n+1)[4n+9] \tag{3}$$

$$4n^2 + 13n - 627 = 0 \tag{4}$$

On solving this quadratic equation, we get roots $n = -12.5$ and $n = 11$

Since we are looking for positive terms of n, we remove the negative root

$$\implies n = 11 \tag{5}$$

$\therefore$ the total number of terms are 12

The Z-Transform of the above question is

$$X(z) = \frac{9}{1 - z^{-1}} + \frac{8z^{-1}}{(1 - z^{-1})^2} \tag{6}$$

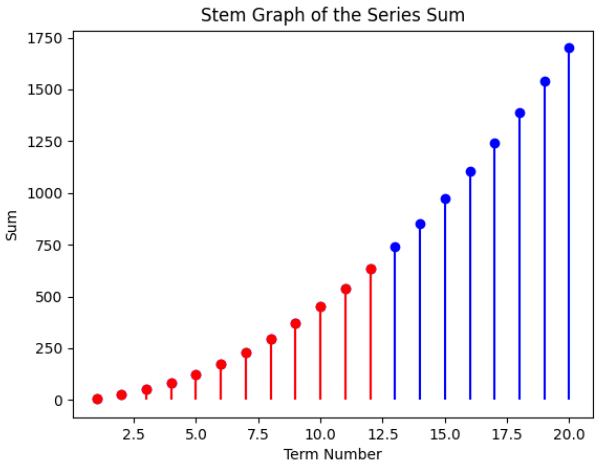

Fig. 0. Plot of y(n) *vs* n