

10.5-2

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QUESTION: The 17th term of ap exceeds its 10th term by 7. Find its common difference?
Solution:

$$x(n) = \{x(0) + nd\}u(n) \quad (1)$$

$$x(17) - x(10) = 7 \quad (2)$$

$$\Rightarrow x(0) + 17d - x(0) + 10d = 7 \quad (3)$$

$$\Rightarrow 17d - 10d = 7 \quad (4)$$

$$\Rightarrow 7d = 7 \quad (5)$$

$$\Rightarrow d = 1 \quad (6)$$

Variable	Description	Value
$x(n)$	n^{th} term of AP	none
d	common difference between the terms of AP	none
$x(17) - x(10)$	difference of 17^{th} and 10^{th} term of X	7

TABLE 0

INPUT PARAMETERS

Taking Z-Transform:

1) $\mathcal{Z}\{u(n)\}$

$$u(n) \longleftrightarrow Z \frac{1}{1 - z^{-1}} \{|z| > 1\} \quad (7)$$

2) $\mathcal{Z}\{nu(n)\}$

$$nu(n) \longleftrightarrow Z \frac{z^{-1}}{(1 - z^{-1})^2} \{|z| > 1\} \quad (8)$$

Taking Z-Transform of (??) using (??) and (??)

$$X(n) = 100 \frac{1}{1 - z^{-1}} + \frac{z^{-1}}{(1 - z^{-1})^2} \quad (9)$$

Let

$$x(n) = \{101, 102, 103, \dots\} \quad (10)$$

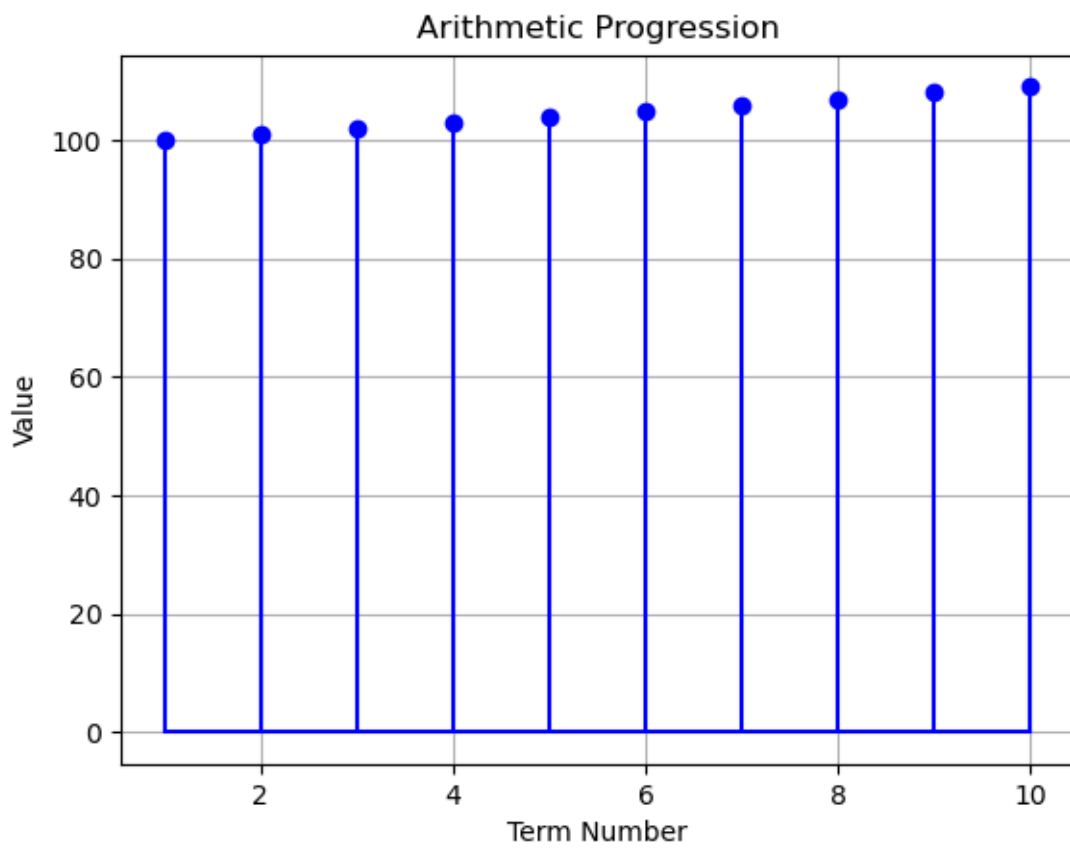


Fig. 2.