

Discrete Assignment

EE:1205 Signals and Systems
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I. QUESTION 10.5.2.13

How many 3 digit numbers are divisible by 7?

II. SOLUTION

TABLE 1
INPUT PARAMETERS

Parameter	Used to denote	Values
$x(0)$	First three digit number divisible by 7	105
$x(k-1)$	Last three digit number divisible by 7	?
d	Common difference of A.P	7
k	Number of 3 digit terms divisible by 7	?

We can use modular arithmetic to determine last three digit number divisible by 7 .

$$x(k-1) \equiv 0 \pmod{7} \quad (1)$$

So we need to find the largest multiple of 7 less than 1000. We can find this by subtracting the remainder when 1000 is divided by 7 from 1000.

$$1000 - (1000 \bmod 7) = 1000 - 6 \quad (2)$$

$$x(k-1) = 994 \quad (3)$$

From Table 1, the number of terms in the AP, k is:

$$k = \frac{x(k-1) - x(0)}{d} + 1 \quad (4)$$

$$k = \frac{994 - 105}{7} + 1 = 128 \quad (5)$$

Taking z transform using ?? :

$$X(z) = \frac{105 - 98z^{-1}}{(1 - z^{-1})^2} \quad |z| > 1 \quad (6)$$

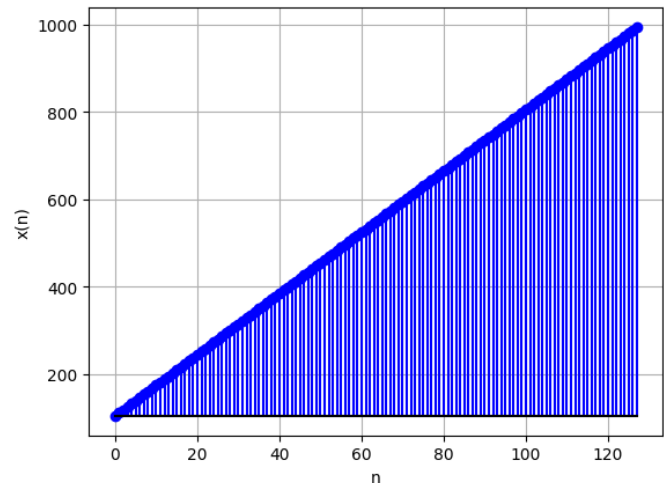


Fig. 1. Plot of $x(n)$