Discrete Assignment

EE:1205 Signals and Systems
Indian Institute of Technology, Hyderabad

Abhey Garg
EE23BTECH11202

I. Question 10.5.2.13

How many 3 digit numbers are divisible by 7?

II. Solution

TABLE 0
Input Parameters

Parameter	Value	Description
a	105	First 3 digit number divisible by 7
d	7	Common difference between two consecutive terms of A.P
a_n	994	Last 3 digit number divisible by 7

Three digit numbers which are divisible by 7 are $105, 112, 119, \ldots, 994$, which form an arithmetic progression (A.P).

The nth term of this A.P is given by

$$a_n = a_1 + (n-1)d \tag{1}$$

$$a_n = 105 + 7(n-1) \tag{2}$$

$$a_n = 98 + 7n \tag{3}$$

To find the number of terms (n) in this A.P, we substitute the last term $a_n = 994$ into equation 3:

$$994 = 98 + 7n \tag{4}$$

Solving for n, we get:

$$7n = 994 - 98 \tag{5}$$

$$7n = 896 \tag{6}$$

$$n = \frac{896}{7} \tag{7}$$

$$n = 128 \tag{8}$$

Hence, there are 128 three-digit numbers that are divisible by 7 in the given sequence.