Discrete Assignment
EE1205 Signals and Systems

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Question 11.9.1.2: Write the first five terms of the sequence whose n^{th} terms $x\left(n\right) = \frac{n}{n+1}$
Solution:

Term	**Value**
$x\left(n\right)$	$\frac{n}{n+1}u\left(n\right)$

Table 1: Input Parameters: General term

Here, Z-transform

$$X(z) = \sum_{i=1}^{\infty} x\left(n\right).z^{-n} \tag{1}$$

$$= \sum_{i=1}^{\infty} \frac{n}{n+1}.z^{-n} \tag{2}$$

$$= \sum_{i=1}^{\infty} u\left(n\right).z^{-n} - \frac{1}{n+1}u\left(n\right).z^{-n} \tag{3}$$

On solving,

$$Z\{u\left(n\right)\} = \frac{1}{1-z^{-1}} \tag{4}$$

$$Z\{\frac{-1}{n+1}.u\left(n\right)\} = z\log(1-z^{-1}) \tag{5}$$

$$X(z) = \frac{1}{1-z^{-1}} + z\log\left(1-z^{-1}\right) \tag{6}$$

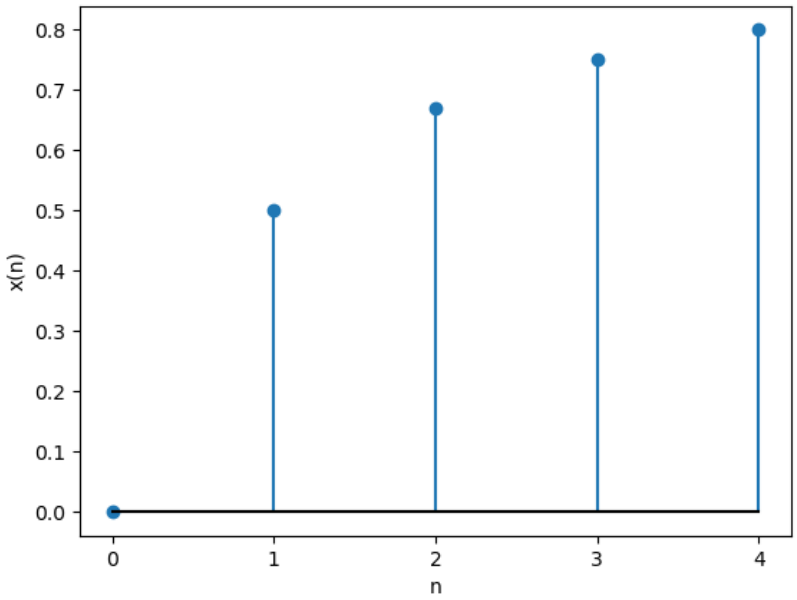

Figure 1: Sequence plot generated from Python script