

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 $x(n) = \frac{n}{n+1}$

Solution:

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

Table 1: Variable description

Z-transform is defined as,

$$x(n) \xleftrightarrow{z} X(z)$$

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

Here, Z-transform

$$X(z) = \sum_{i=1}^{\infty} x(n).z^{-n} \quad (2)$$

$$= \sum_{i=1}^{\infty} \frac{n}{n+1}.z^{-n} \quad (3)$$

On solving,

$$X(z) = \frac{1}{1-z^{-1}} + z \log(1-z^{-1}) \quad (4)$$

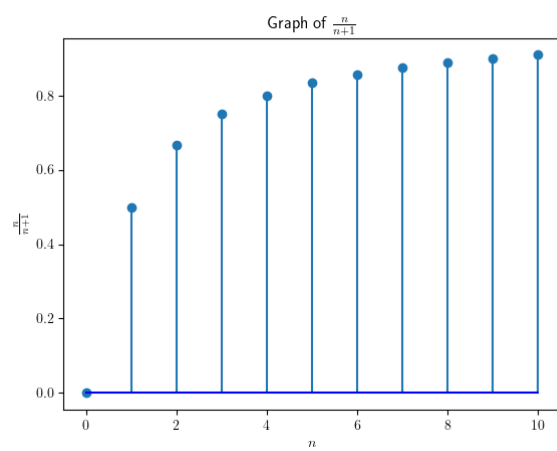


Figure 1: Sequence plot generated from Python script