Discrete Assignment EE1205 Signals and Systems

Praful Kesavadas EE23BTECH11049

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(n)	$\frac{n}{n+1}u(n)$

Table 1: Input Parameters: General term

Here, Z-transform

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

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

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

Now,

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

$$\frac{-1}{n+1}.u(n) \stackrel{Z}{\longleftrightarrow} z \log(1-z^{-1}) \tag{5}$$

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

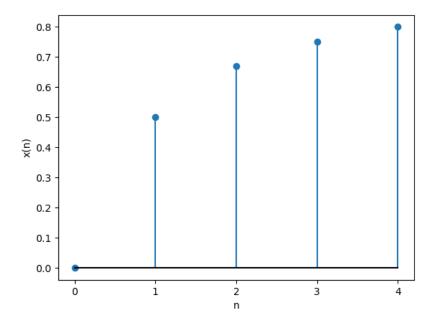


Figure 1: Sequence plot generated from Python script