

Discrete Assignment

EE1205 Signals and Systems

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Question 11.9.1.2: Write the first five terms of the sequence whose terms are represented by $x_n = \frac{n}{n+1}$

Solution: Given the terms of the sequence are $x(n) = \frac{n}{n+1}$ where $n = 0, 1, 2, 3, 4, \dots$
In terms of $u(n)$, x_n is

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

Z-transform is defined as,

$$P(Z) = \sum_{i=-\infty}^{\infty} P(n).Z^{-n}$$

Here, Z-transform

$$\begin{aligned} P(Z) &= \sum_{i=1}^{\infty} x(n).Z^{-n} \\ &= \sum_{i=1}^{\infty} \frac{n}{n+1}.Z^{-n} \end{aligned}$$

On solving,

$$P(Z) = \frac{Z}{Z-1} + Z \log(1 - Z^{-1})$$