

NCERT Discrete - 11.9.1.8

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Question 11.9.1.8:

- 1) Find the seventh term of the sequence where the nth term is given by $a_n = \frac{n^2}{2^n}$

Solution:

$$x(n) = \frac{(n+1)^2}{2^{(n+1)}} u(n) \quad (1)$$

Parameter	Value
$x(n)$	$\frac{(n+1)^2}{2^{(n+1)}} u(n)$
$x(6)$?

TABLE I
INPUT PARAMETERS

$$x(6) = \frac{(6+1)^2}{2^{(6+1)}}$$

$$x(6) = \frac{49}{128}$$

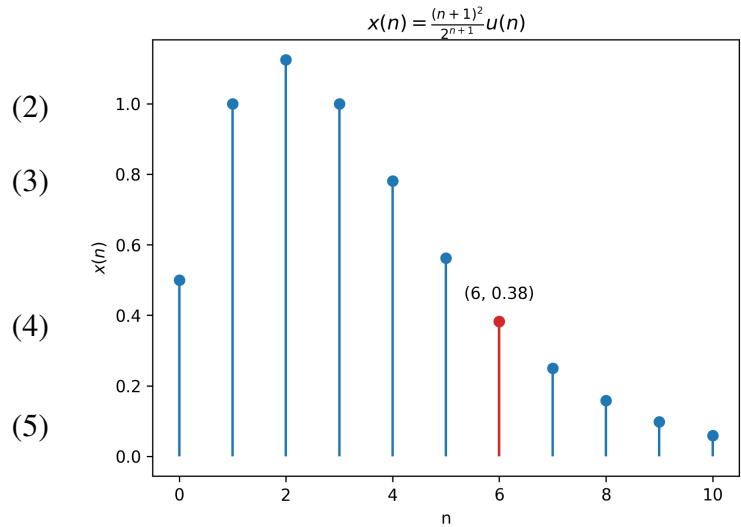
The Z transform of x(n) is given by

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

$$X(z) = \sum_{n=0}^{\infty} \frac{(n+1)^2}{2^{(n+1)}} z^{-n}$$

Using differentiation and scaling property

$$X(z) = \frac{(1 + (2z)^{-1})}{2(1 - (2z)^{-1})^3}; ROC \quad |z| > \frac{1}{2}$$



(6) Fig. 1. stem plot of $x(n)$