

DISCRETE 11.9.3 Q-4

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Question:

The 4th term of a G.P. is square of its second term, and the first term is -3. Determine its 7th term.

Solution:

Variable	Description	value
$x(0)$	first term of G.P.	-3
r	Common ratio of G.P.	?
$x(n)$	general term of the G.P.	$x(0) r^n$
$x(3)$	fourth term	$[x(1)]^2$
$u(n)$	unit step function	-

TABLE I

A TABLE WITH INPUT PARAMETERS

from Table I

$$x(0) r^3 = (x(0) r^1)^2 \quad (1)$$

$$= x(0)^2 r^2 \quad (2)$$

$$\Rightarrow r = x(0) \quad (3)$$

$$= -3 \quad (4)$$

general term

$$x(n) = x(0) r^n u(n) \quad (5)$$

$$= (-3)^{n+1} u(n) \quad (6)$$

The 7th term of the sequence will be:

$$x(6) = (-3)(-3)^6 \quad (7)$$

$$= -2187 \quad (8)$$

Z transform of the given G.P is:

$$X(z) = \frac{x(0)}{1 - rz^{-1}} = \frac{-3}{1 + 3z^{-1}} \quad |z| > 3 \quad (9)$$

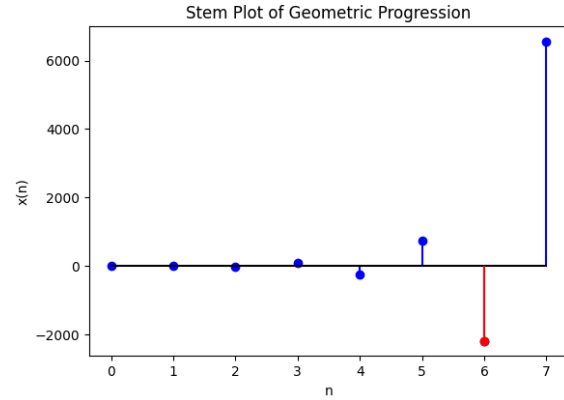


Fig. 1. Graph showing first 8 terms of the GP