

11.9.3.3

EE23BTECH11065 - prem sagar

Question:

The 5th, 8th and 11th terms of a GP are p, q and s respectively. show that

$$q^2 = ps$$

solution

Symbol	Value	Description
$x(5)$	p	5th term of G.P
$x(8)$	q	8th term of G.P
$x(11)$	s	11th term of G.P

TABLE 0
INPUT PARAMETERS

$$x(n) = x(0) r^n \quad (1)$$

$$x(5) = x(0) r^5 \quad (2)$$

$$x(8) = x(0) r^8 \quad (3)$$

$$x(11) = x(0) r^{11} \quad (4)$$

$$x(8) x(8) = x(0) r^8 x(0) r^8 \quad (5)$$

$$= x(0)^2 r^{16} \quad (6)$$

$$x(5) x(11) = x(0) r^5 x(0) r^{11} \quad (7)$$

$$= x(0)^2 r^{16} \quad (8)$$

$$x(8)^2 = x(5) x(11) \quad (9)$$

$$q^2 = ps \quad (10)$$

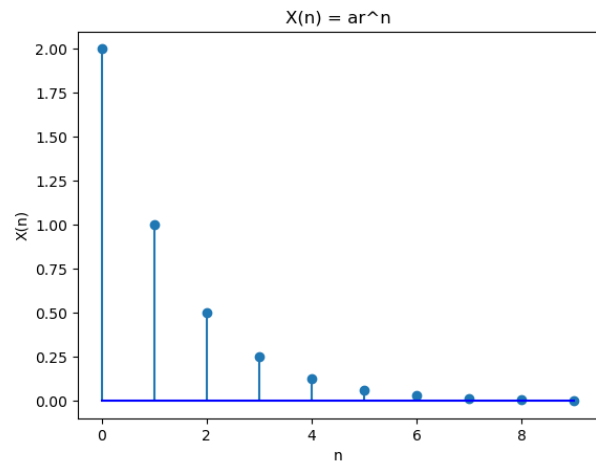


Fig. 0. plot x(n) vs n

$$(11)$$

$$x(n) \xleftrightarrow{Z} X(Z) \quad (12)$$

$$x(n) = x(0) r^n u(n) \quad (13)$$

$$X(Z) = \sum_{n=-\infty}^{\infty} x(n) Z^{-n} \quad (14)$$

$$= \frac{x(0)}{1 - r Z^{-1}}, |z| > |r| \quad (15)$$