NCERT-discrete : 11.9.3 - 21

EE23BTECH11025 - Anantha Krishnan

I. QUESTION

Find four numbers forming a geometric progression in which the third term is greater than the first term by 9, and the second term is greater than the 4^{th} by 18.

Solution: Let's assume the 4 terms of the geometric sequences are a, ar, ar^2, ar^3.

Here,the common ratio is r. It is given that

$$ar^2 - a = 9 \tag{1}$$
$$ar - ar^3 = 18 \tag{2}$$

Now, we solve (1) and (2)
From (1)

$$a(r^2 - 1) = 9 \tag{3}$$

Therefore

$$(r^2 - 1) = \frac{9}{a} \tag{4}$$

also from (2)

$$ar(1 - r^2) = 18 \tag{5}$$

Putting the value of $r^2 - 1$ in the above equation gives

$$ar(\frac{-9}{a}) = 18 \tag{6}$$

Which in solving gives r=-2. Putting the value of r in (1) yields a=3. Therefore , the final geometric series is 3 , -6 , 12 , -24.