11.9.3.25

EE23BTECH11003 - pranav

question: if a, b, c and d are in GP then show that $(a^2 + b^2 + c^2)(b^2 + c^2 + d^2) = (ab + bc + cd)^2$

Solution: let a, b, c and d are a part of GP x(n)

Variable	Description	Value
a	First term of the GP	$x(0)$
r	Common ratio of the GP	r
b	second term of GP	$x(0)r$
c	third term of GP	$x(0)r^2$
d	fourth term of the GP	$x(0)r^3$

TABLE 1: Variables Used

$$= (a^2 + b^2 + c^2)(b^2 + c^2 + d^2) \tag{1}$$

$$= (x(0)^2 + (x(0)r)^2 + (x(0)r^2)^2)((x(0)r)^2 + (x(0)r^2)^2 + (x(0)r^3)^2) \tag{2}$$

$$\implies = x(0)^4 r^2 (1 + r^2 + r^4)^2 \tag{3}$$

$$\implies = (ab)^2 (1 + (\frac{c}{a})^2 + (\frac{cd}{ab})^2) \tag{4}$$

$$\implies = (ab + bc + cd)^2 \tag{5}$$