EE23BTECH11047 - Deepakreddy P

17 If a, b, c, d are in G.P, prove that $(a^n+b^n), (b^n+c^n), (c^n+d^n)$ are in G.P.

Solution:

$$a = ar^0 \tag{1}$$
$$b = ar^1 \tag{2}$$
$$c = ar^2 \tag{3}$$
$$d = ar^3 \tag{4}$$

$$\frac{(b^n + c^n)}{(a^n + b^n)} = \frac{(c^n + d^n)}{(b^n + c^n)} \tag{5}$$

$$\frac{(ar^1)^n + (ar^2)^n}{(ar^0)^n + (ar^1)^n} = \frac{(ar^2)^n + (ar^3)^n}{(ar^1)^n + (ar^2)^n} \tag{6}$$

$$\frac{a^n r^n (1 + r^n)}{a^n (1 + r^n)} = \frac{a^n r^{2n} (1 + r^n)}{a^n r^n (1 + r^n)} \tag{7}$$

$$r^n = r^n \tag{8}$$

Hence proved they are in in G.P