



**Example 42 :** In the convex quadrilateral  $ABCD$ , the diagonal  $BD$  does not bisect any of the opposite angles, the point  $P$  is inside the quadrilateral  $ABCD$ , and satisfies  $\angle PBC = \angle DBA$  and  $\angle PDC = \angle BDA$ . If  $A, B, C, D$  are four points in a circle, prove :  $AP = CP$ . ( The 45th International Mathematical Olympiad Test Questions )

$$\frac{A-P}{C-A} = T, \quad \frac{B-P}{C-A} = t_1, \quad \frac{C-B}{D-C} = t_2, \quad \frac{D-C}{A-C} = t_3, \quad T - t_1 + t_1 t_2 + t_1 t_3 - t_2 t_3 = 0,$$

$$\frac{C-P}{C-D} = t_1, \quad \frac{D-P}{D-C} = t_2, \quad \frac{A-B}{A-C} = t_3$$