Solution:

From the geometry, we have:

$$C_x = P_x - D\cos\phi$$
$$C_y = P_y - D\sin\phi$$

Then

$$B = \pm\sqrt{C_x^2 + C_y^2}$$

$$A = \text{atan}2\left(\frac{C_y}{B}, \quad \frac{C_x}{B}\right)$$

$$C = \pi - \phi + A$$

There are two solutions for the joint variables.