$$B = (-b, a)$$

$$D = (r_3 \cos\alpha, r_3 \sin\alpha)$$

$$C = (-b + r_2\cos\theta,\ a + r_2 \sin\theta)$$

$$d = d(C,D) = \sqrt{(r_3\cos\alpha + b - r_2\cos\theta)^2 + (r_3\sin\alpha - a - r_2\sin\theta)^2}$$

$$p = r_3\cos\alpha + b, \qquad q = r_3\sin\alpha - a$$

$$\Rightarrow (p - r_2\cos\theta)^2 + (q - r_2\sin\theta)^2 = d^2$$

$$p^2 - 2pr_2\cos\theta + \underbrace{r_2^2\cos^2\theta + q^2 - 2qr_2\sin\theta + r_2^2\sin^2\theta}_{r_2^2} = d^2$$

$$p^2 + q^2 + r_2^2 - 2r_2(p\cos\theta + q\sin\theta) = d^2$$

$$k = \frac{p^2 + q^2 + r_2^2 - d^2}{2r_2}$$

$$\Rightarrow p\cos\theta + q\sin\theta = k$$

$$x = \frac{p}{\sqrt{p^2+q^2}}; \qquad y = \frac{q}{\sqrt{p^2+q^2}} \Rightarrow x^2 + y^2 = 1$$

$$\beta = \arccos(x) = \arcsin(y)$$

$$\Rightarrow p\cos\theta + q\sin\theta = \sqrt{p^2+q^2}\,(x\sin\theta + y\cos\theta) =$$

$$= \sqrt{p^2+q^2}\,\sin(\theta+\beta)$$

$$\Rightarrow \theta = \arcsin\left(\frac{k}{\sqrt{p^2+q^2}}\right) - \arcsin\left(\frac{q}{\sqrt{p^2+q^2}}\right)$$