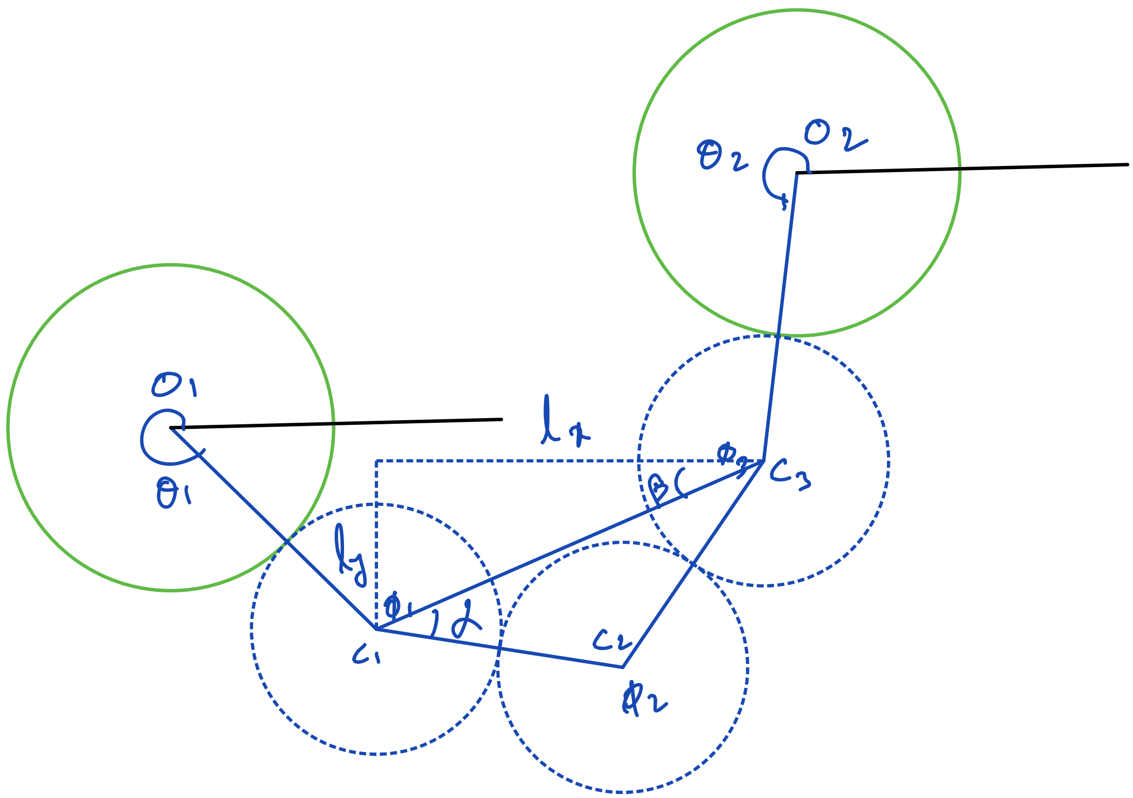

$$\theta_1 + \frac{\pi}{2} - \phi_1 + \phi_2 - \phi_3 = \theta_2 + \frac{\pi}{2}$$

$$\phi_1 + \phi_3 = \theta_1 - \theta_2 + \phi_2$$

$$\phi_1 + \phi_2 + \phi_3 = 2\phi_2 + \theta_1 - \theta_2$$

$$\frac{\partial L_{RLR}}{\partial \theta_1} = 2\rho \frac{\partial \phi_2}{\partial \theta_1} + \rho$$

$$\frac{\partial L_{RLR}}{\partial \theta_2} = 2\rho \frac{\partial \phi_2}{\partial \theta_1} - \rho$$

$$2\pi - \phi_2 = \pi - 2\alpha$$

$$\frac{\partial L_{RLR}}{\partial \theta_1} = 4\rho \frac{\partial \alpha}{\partial \theta_1} + \rho$$

$$\alpha = \cos^{-1}\left(\frac{\|C_1 C_3\|}{4\rho}\right)$$

$$= \cos^{-1}\left(\frac{\sqrt{l_x^2 + l_y^2}}{4\rho}\right)$$

$$l_x = O_1^x + (r_t + \rho)\cos\theta_1 - O_2^x - (r_t + \rho)\cos\theta_2$$

$$l_y = O_1^y + (r_t + \rho)\sin\theta_1 - O_2^y - (r_t + \rho)\sin\theta_2$$

$$\frac{\partial \alpha}{\partial \theta_1} = -\frac{1}{\sin\alpha}\frac{1}{4\rho}\frac{1}{2\sqrt{l_x^2 + l_y^2}}\Big(-2\, l_x (r_t + \rho)\sin\theta_1$$

$$+ 2\, l_y (r_t + \rho)\cos\theta_1\Big)$$

$$= -\frac{(r_t+\rho)}{4\rho \sin\alpha}\left(-\frac{l_x}{\sqrt{l_x^2+l_y^2}}\sin\theta_1 + \frac{l_y}{\sqrt{l_x^2+l_y^2}}\cos\theta_1\right)$$

$$= -\frac{r_t+\rho}{4\rho \sin\alpha}\left(-\sin\theta_1 \cos\beta + \sin\beta \cos\theta_1\right)$$

$$= -\frac{r_t+\rho}{4\rho \sin\alpha}\sin(\beta-\theta_1)$$

$$\frac{\partial L_{RLR}}{\partial \theta_1} = -\frac{(r_t+\rho)\sin(\beta-\theta_1)}{\sin\alpha} + \rho$$

This derivative is zero when line connecting inflexion points is collinear with center of arc..