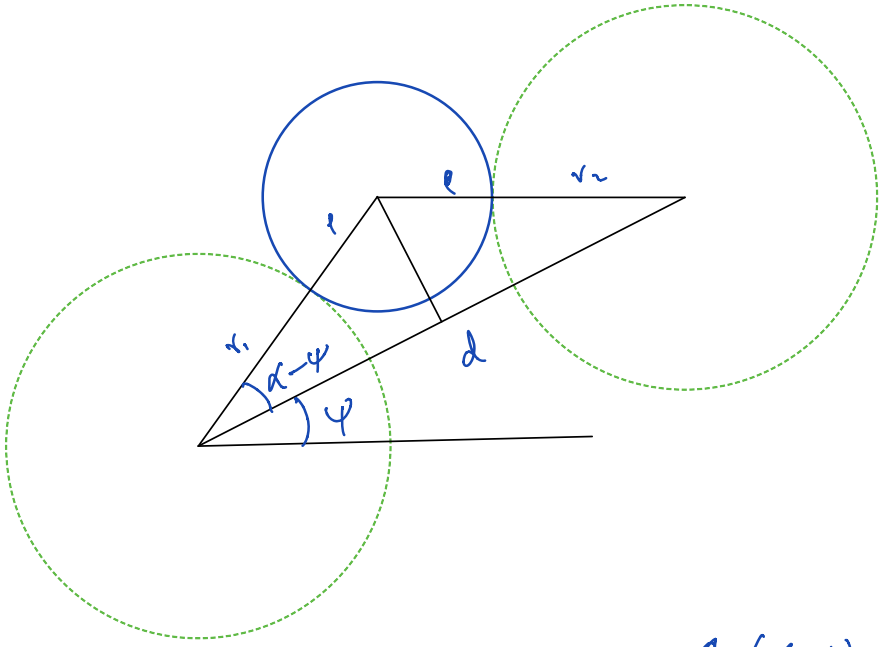
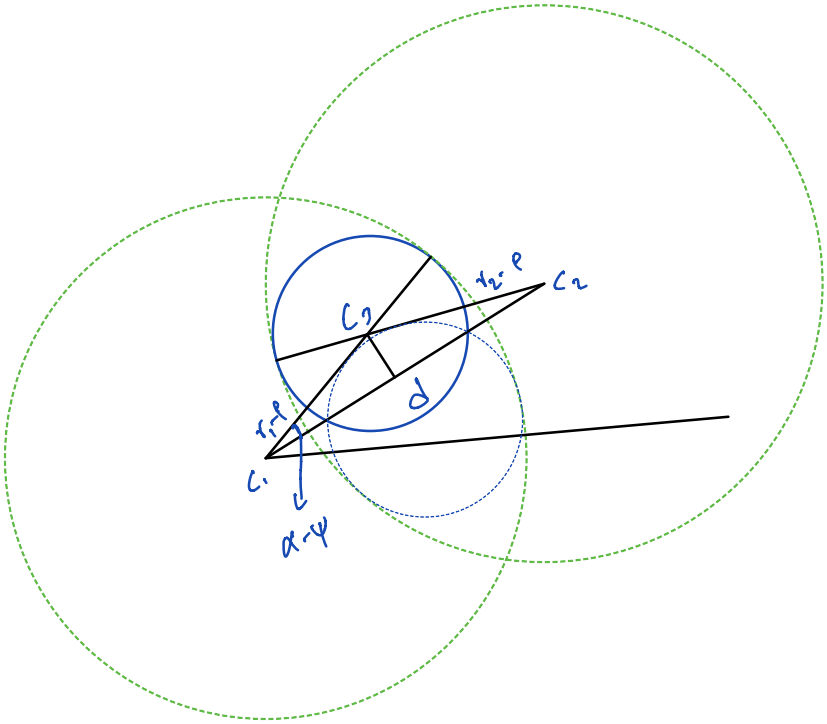



$$(r_2+r)^2 = (r_1+r)^2 + d^2 - 2(r_1+r)d\cos(\alpha-\psi)$$

$$\cos(\alpha-\psi) = \frac{(r_1+r)^2 + d^2 - (r_2+r)^2}{2(r_1+r)d}$$



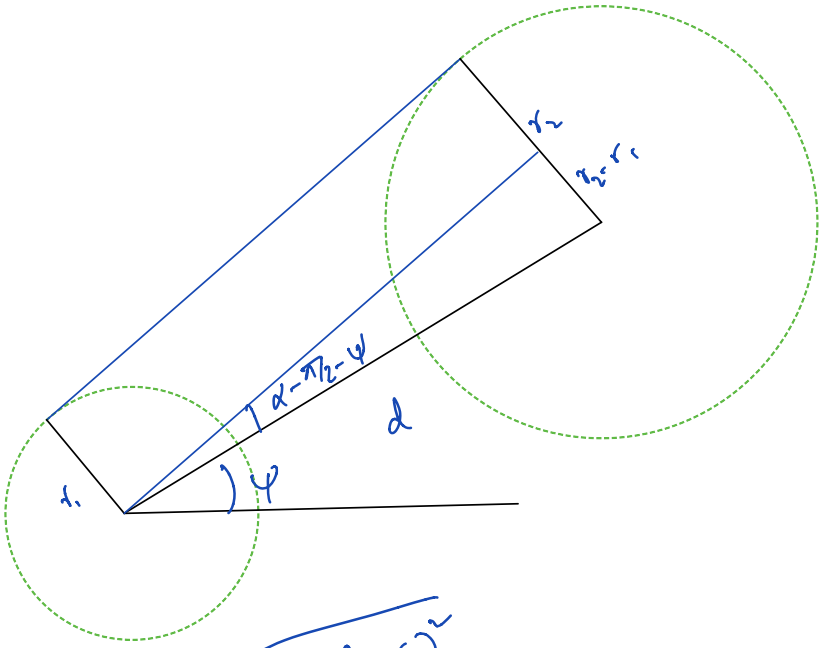

$\triangle C_1C_2C_3$

$$(r_2-\rho)^2 = (r_1-\rho)^2 + d^2 - 2(r_1-\rho)d\cos(\alpha-\psi)$$

$$\cos(\alpha-\psi) = \frac{(r_1-\rho)^2 + d^2 - (r_2-\rho)^2}{2(r_1-\rho)\,d}$$

$$d^2 = (r_1-\rho)^2 + (r_2-\rho)^2 - 2(r_1-\rho)(r_2-\rho)\cos\phi$$

$$r_1-\rho > d + r_2 - \rho$$




$$L_s = \sqrt{d^2 - (r_2 - r_1)^2}$$

$$\sin\left(\alpha - \frac{\pi}{2} - \psi\right) = \frac{r_2 - r_1}{d}$$