1 Intro

We have ellipses E_0, E_1, E_2, where E_0 is centered at $(0,0)$. Let the intersection points between E_0 and E_i be r_i, we want $r1 = r2$.

Let h_i, k_i be the center of E_i.

we have the r_i

$$y_i = \frac{b^2(h_1 h_2^2 - h_2 h_1^2) + a^2(h_1 k_2^2 - h_2 k_1^2)}{2a^2(h_1 k_2 - h_2 k_1)} \tag{1}$$