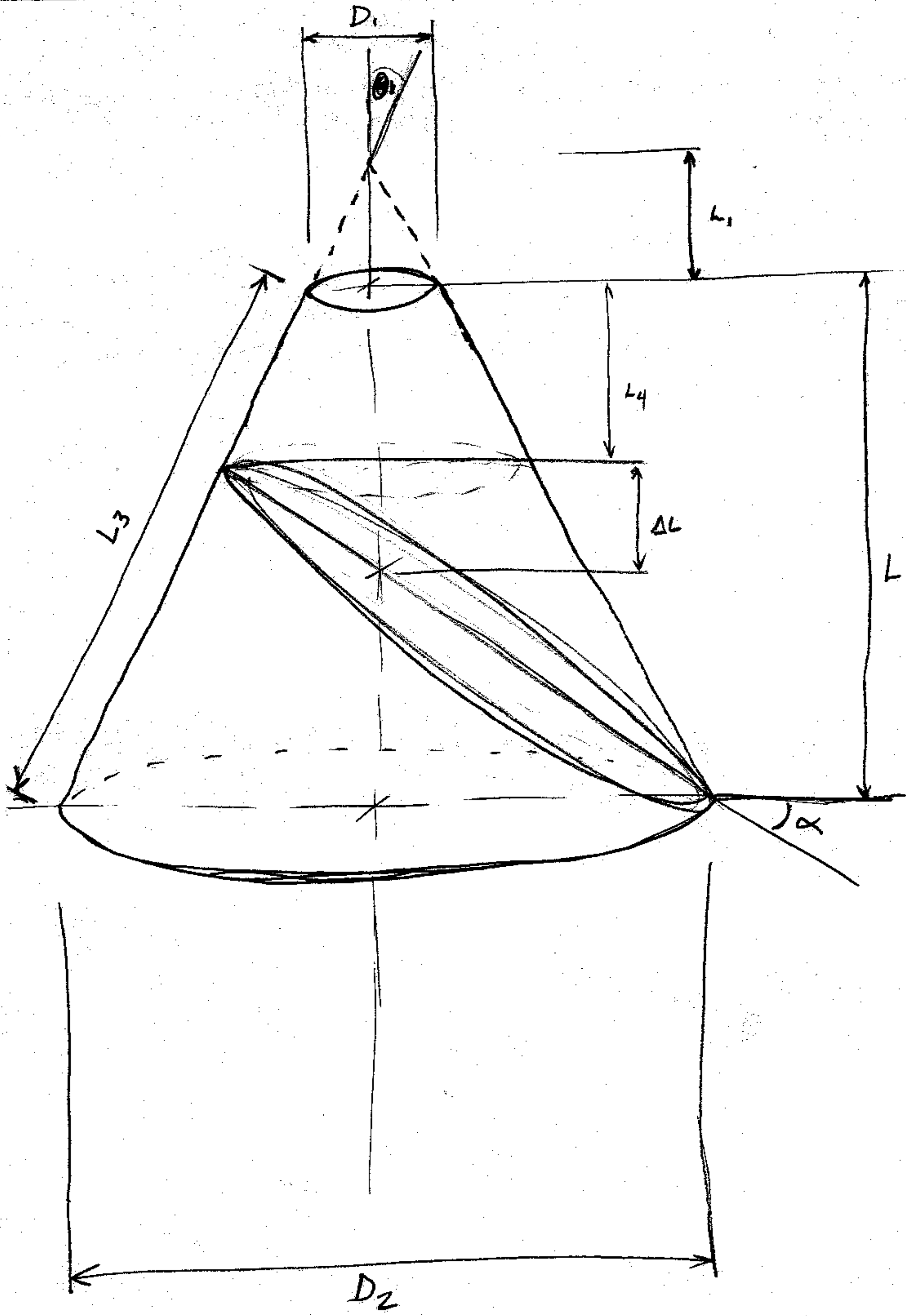


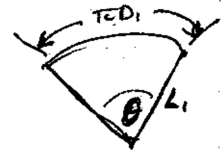
D_1
θ_1
L_1
L_4
ΔL
L_2
L_3
α
D_2

Circumference @ D_1 = πD_1

Using origin of L_1, draw an arc of length πD_1

the angle would be defined as

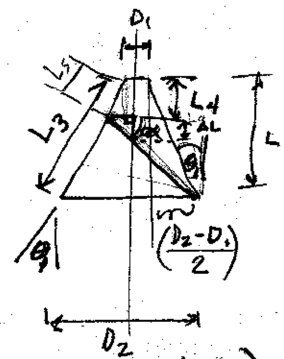
$$\theta = \frac{\pi D_1}{L_1}$$



if $L_1 = D_1$; $\theta = \pi$ or $180°$

if $L_1 < D_1$; $\theta > \pi$

if $L_1 > D_1$; $\theta < \pi$



$$\frac{L_2}{\left(\frac{D_2-D_1}{2}\right)} = \frac{L_4}{x}$$

$$\theta_1 = \tan^{-1}\left(\frac{\frac{D_2-D_1}{2}}{L_2}\right)$$

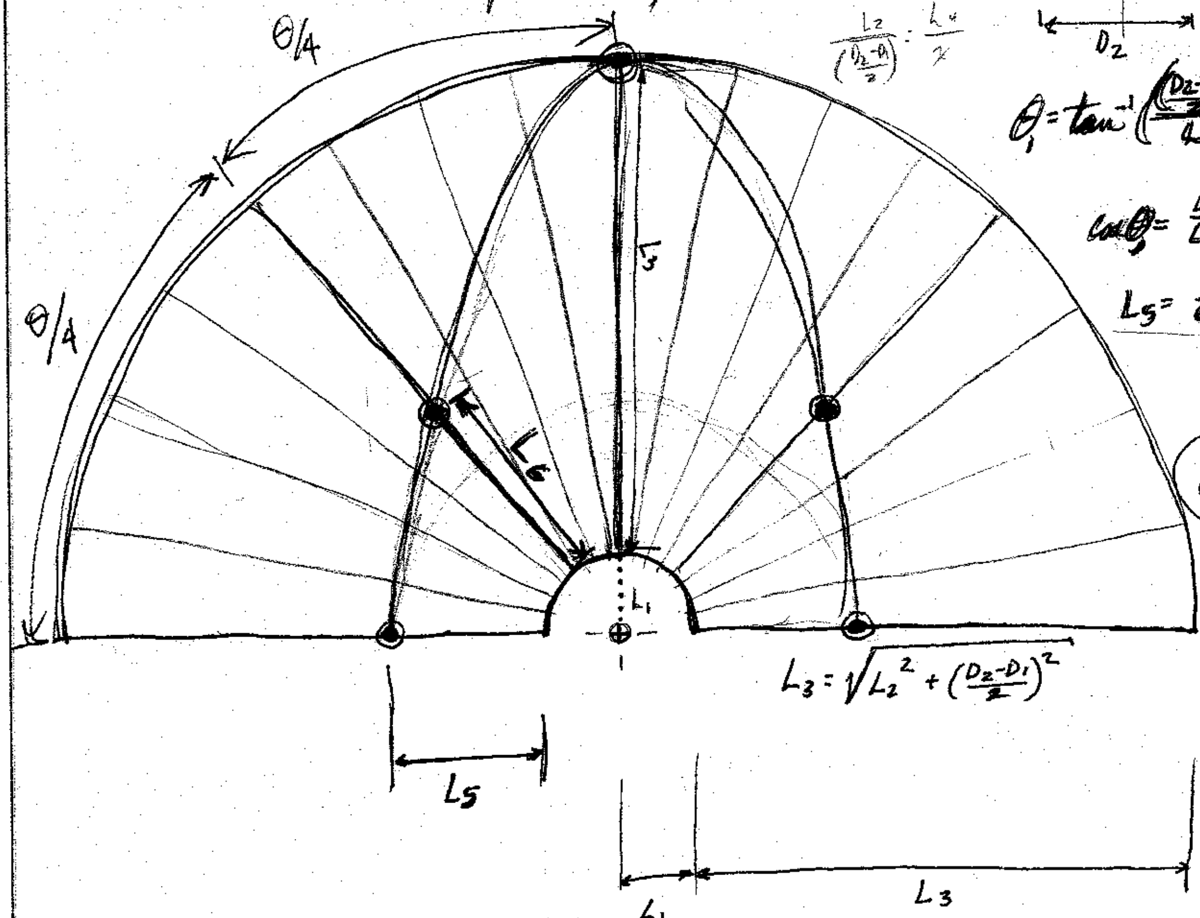
$$\cos\theta_1 = \frac{L_4}{L_5}$$

$$L_5 = \frac{L_4}{\cos\theta_1}$$

$$\frac{D_1}{2} + L_5 \sin\theta_1$$

$$\tan\alpha = \frac{\Delta L}{\frac{D_1}{2} + L_5 \sin\theta_1}$$

$$\frac{\Delta L + L_4}{\cos\theta_1} = L_6$$



$$L_3 = \sqrt{L_2^2 + \left(\frac{D_2-D_1}{2}\right)^2}$$

Translate points to XY coordinate

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$$

? $\boxed{\text{assume}}$ F and attempt to solve the equations

$$\begin{bmatrix} x_1^2 & x_1y_1 & y_1^2 & x_1 & y_1 & 1 \\ x_2^2 & x_2y_2 & \cdots & & y_2 & 1 \\ x_3^2 & x_3y_3 & & & y_3 & 1 \\ x_4^2 & \vdots & & & y_4 & 1 \\ x_5^2 & & & & y_5 & 1 \end{bmatrix} \begin{bmatrix} A \\ B \\ C \\ D \\ E \\ F \end{bmatrix} = 0$$

$$\tan\alpha = \frac{\Delta L}{\frac{D_1}{2} + L_5 \sin\theta_1}$$

$$\Delta L = \tan\alpha \left(\frac{D_1}{2} + L_5 \sin\theta_1\right)$$

$$\frac{\Delta L + L_4}{\cos\theta_1} = L_6$$