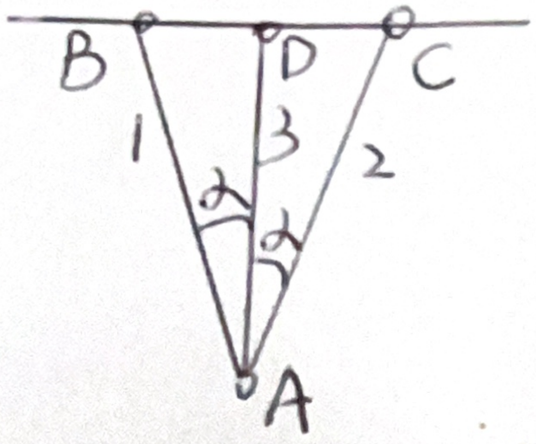
Statically Indetermine



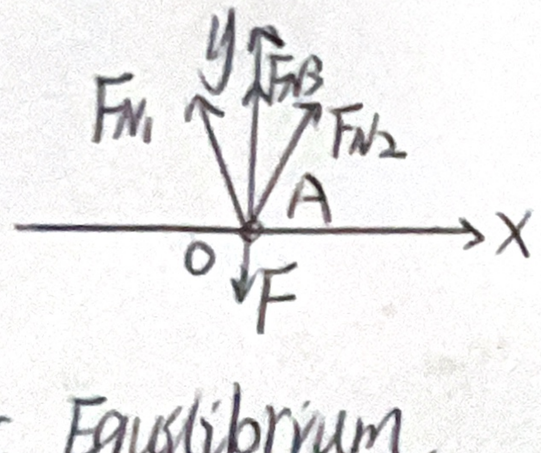
$\alpha = 20°$, $l_3 = 100mm$

$R_1 = R_2 = R_3 = 5mm$

$F = 1000\ N$

material : steel

$E = 200GPa$



Static Equilibrium

$\Sigma F_x = 0$, $F_{N1}\sin\alpha - F_{N2}\sin\alpha = 0$ ①

$\Sigma F_y = 0$, $F_{N1}\cos\alpha + F_{N2}\cos\alpha + F_{N3} - F = 0$ ②

Geometry constraint :

$\Delta l_1 = \Delta l_3 \cos\alpha$

Hookes law , $\Delta l_1 = \frac{F_{N1} l_1}{EA}$, $\Delta l_3 = \frac{F_{N3} l_3}{EA}$

$l_3 = l_1 \cos\alpha$

$$\Rightarrow F_{N3} = \frac{F}{1 + 2\frac{EA}{EA}\cos^3\alpha}$$ ③

$\Rightarrow F_{N1} = F_{N2} = 332.02\ N$ $F_{N3} = 376.00\ N$