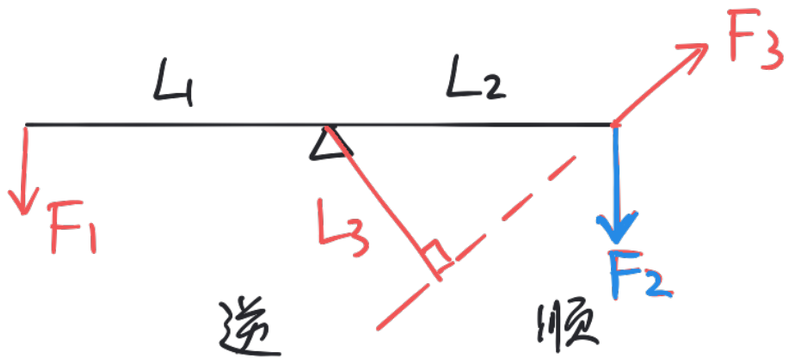
五、杠杆

力矩 $M = F \cdot L$ 力臂.

力矩平衡 $\sum M_{顺} = \sum M_{逆}$

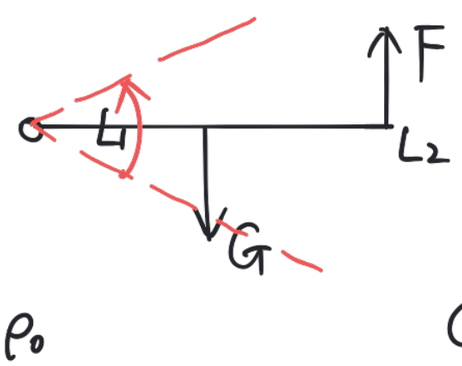
① 找支点 ② 受力分析（不考虑支点）

③ 作力臂 ④ 列方程计算



$F_1 \cdot L_1 + F_3 \cdot L_3 = F_2 \cdot L_2$

动态分析



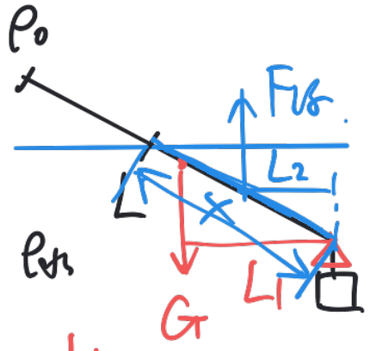
{ F 竖直，$F = \frac{G}{2}$ 不变

F 垂直 L，L_1 先增后减，L_2 不变，F 先增后减.

浮力杠杆

巧取支点

力未知处



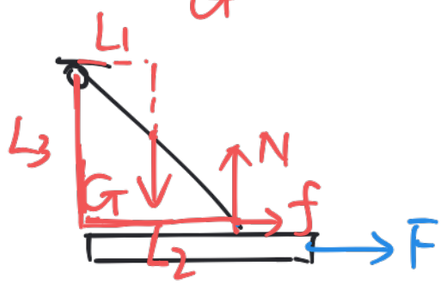
$G \cdot L_1 = F_{浮} \cdot L_2$

浸没长度

$\rho_0 \cdot g \cdot S \cdot L \cdot \frac{L}{2} = \rho_{物} g \cdot S x \cdot \frac{x}{2}$

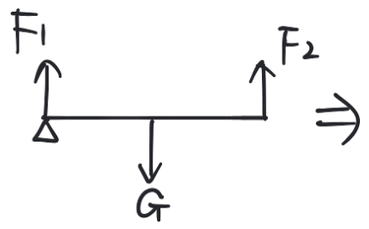
$\rho_0 \cdot L \cdot \frac{L}{2} = \rho_{物} \cdot x \cdot \frac{x}{2}$

摩擦杠杆



$$\begin{cases} G \cdot L_1 = N \cdot L_2 + f \cdot L_3 \\ f = \mu N \end{cases}$$

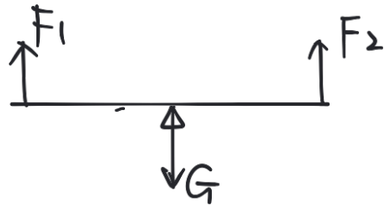
支点变换



$F_2 \cdot L = G \cdot \frac{L}{2}$

$F_2 = \frac{G}{2}$

竖直力平衡 $F_1 + F_2 = G \Rightarrow F_1 = \frac{G}{2}$

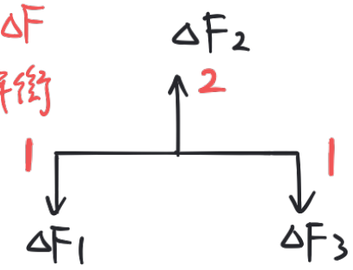


$F_1 \cdot \frac{L}{2} = F_2 \cdot \frac{L}{2}$

$F_1 = F_2 = \frac{G}{2}$

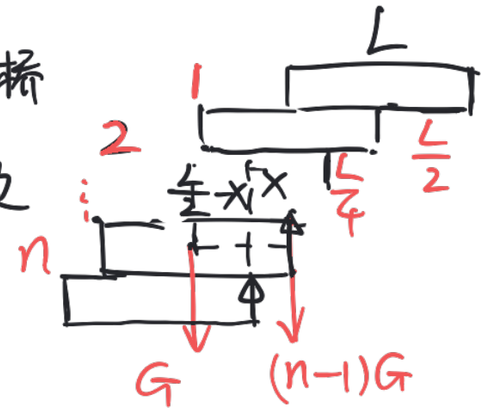
F 变化量 ΔF

满足力矩平衡



搭桥

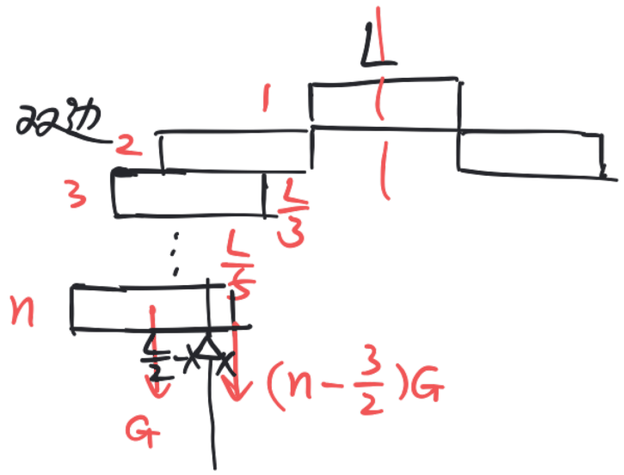
单边



$$G\cdot(\frac{L}{2}-x)=(n-1)G\cdot x$$

$$x=\frac{L}{2n}$$

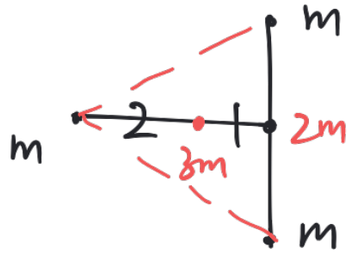
双边



$$G(\frac{L}{2}-x)=(n-\frac{3}{2})G\cdot x$$

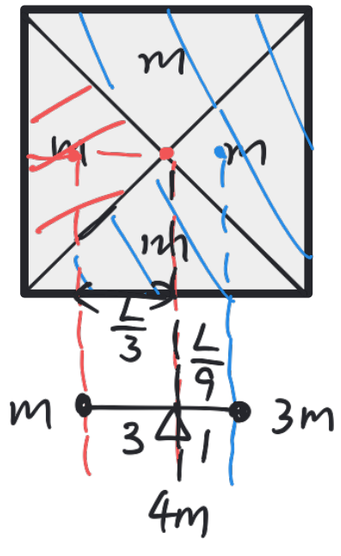
$$x=\frac{L}{2n-1}$$

重心计算

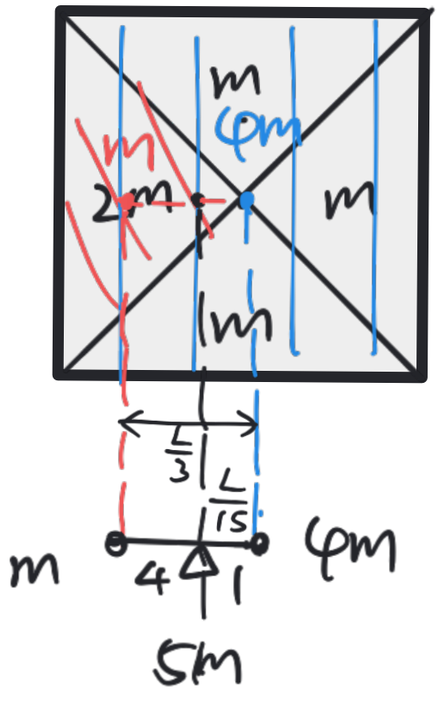


三角形中线交点

求3m重心



割



补.