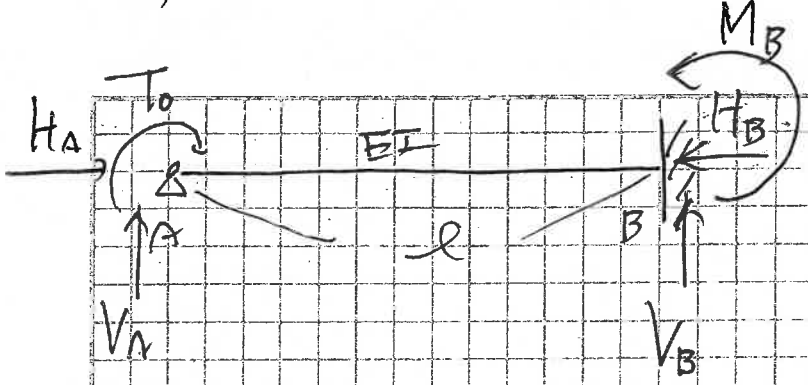
Q) 曲げモーメント図を作成せよ



反力5> → 0 2次不静定

① 材端モーメント式

$$\begin{cases} M_{AB} = \dfrac{2EI}{\ell}(2\theta_A + \theta_B - 3R) + C_{AB} \\ M_{BA} = \dfrac{2EI}{\ell}(\theta_A + 2\theta_B - 3R) + C_{BA} \end{cases}$$

A点 B点の支点移動なし $\therefore R = 0$, $\therefore \theta_B = 0$

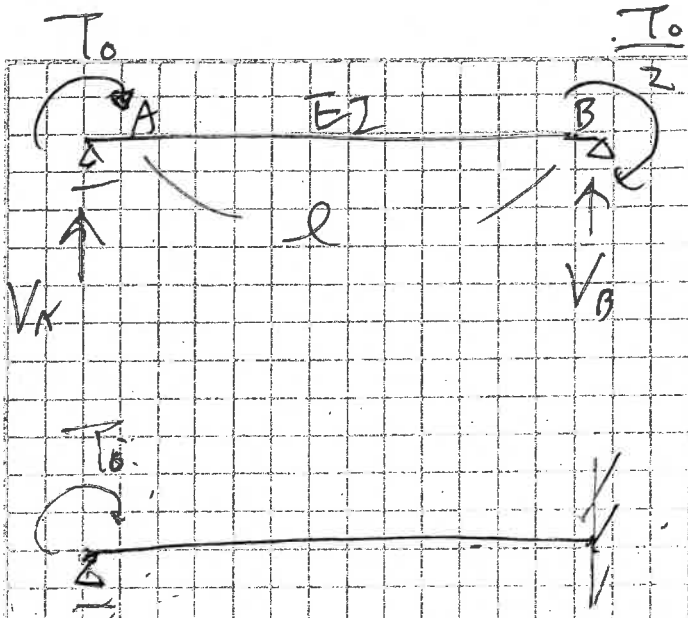
A-B間に荷重なし $\therefore C_{AB} = C_{BA} = 0$

$$\therefore \begin{cases} M_{AB} = \dfrac{2EI}{\ell}(2\theta_A + 0) = \dfrac{4EI}{\ell}\theta_A \\ M_{BA} = \dfrac{2EI}{\ell}(\theta_A + 0) = \dfrac{2EI}{\ell}\theta_A \end{cases}$$

② 節点方程式

$$M_{AB} = T_0 = \frac{4EI}{\ell}\theta_A \quad \therefore \theta_A = \frac{T_0\ell}{4EI} //$$

$$\begin{cases} M_A = M_{AB} = \dfrac{4EI}{\ell} \times \dfrac{T_0\ell}{4EI} = T_0 \\ M_B = -M_{BA} = -\dfrac{2EI}{\ell} \times \dfrac{T_0\ell}{4EI} = -\dfrac{T_0}{2} \end{cases}$$



$$\Sigma H = H_A = H_B = 0$$

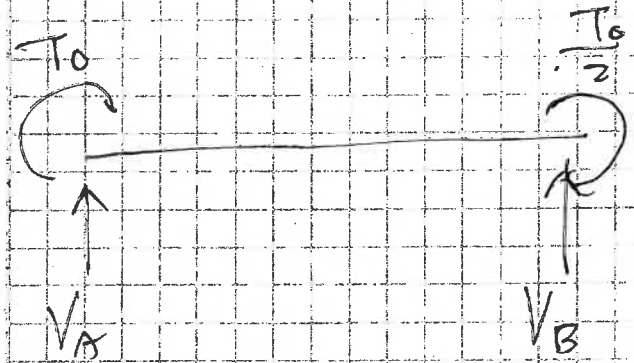
$$\Sigma V = V_A + V_B = 0$$

$$\Sigma M_A = T_0 - V_B \ell + \frac{T_0}{2} = 0$$

$$V_B = \frac{3T_0}{2\ell}$$

$$V_A = -\frac{3T_0}{2\ell}$$

$M_x =$



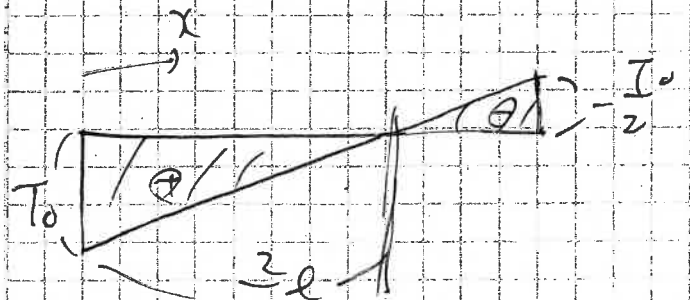
$$\Sigma V = V_A + V_B = 0$$

$$\Sigma M_A = T_0 + \frac{T_0}{2} - V_B \ell = 0$$

$$V_B = \frac{1}{\ell} \times \frac{3}{2} T_0$$

$$= \frac{3T_0}{2\ell}$$

$$V_A = -\frac{3T_0}{2\ell}$$



$$M_x = T_0 + V_A x$$

$$= T_0 - \frac{3}{2\ell} T_0 x$$

$$x = 0, \quad M_x = T_0$$

$$x = \ell, \quad M_\ell = T_0 - \frac{3}{2} T_0$$

$$= -\frac{1}{2} T_0$$

$$< M_{[x]} >$$

$$M_x = T_0 - \frac{3}{2\ell} T_0 x = 0$$

$$x = \frac{2\ell}{3T_0} \times T_0 = \frac{2}{3}\ell$$