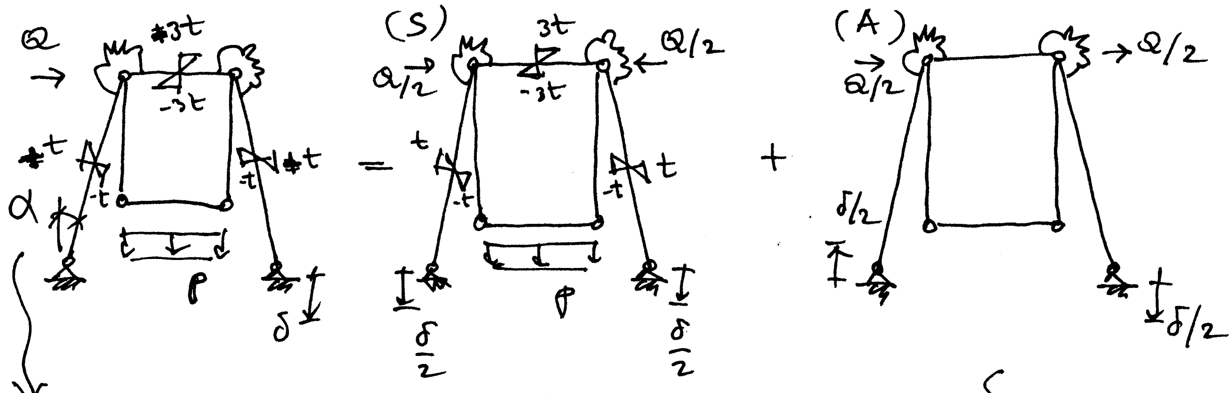
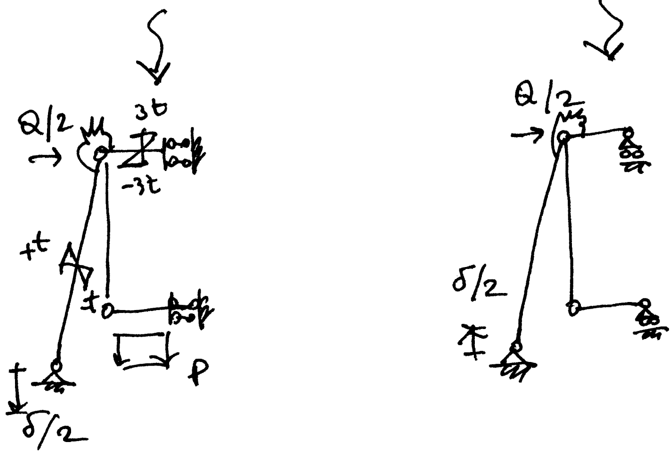
PS SdC(1)-A del 23.07.2010

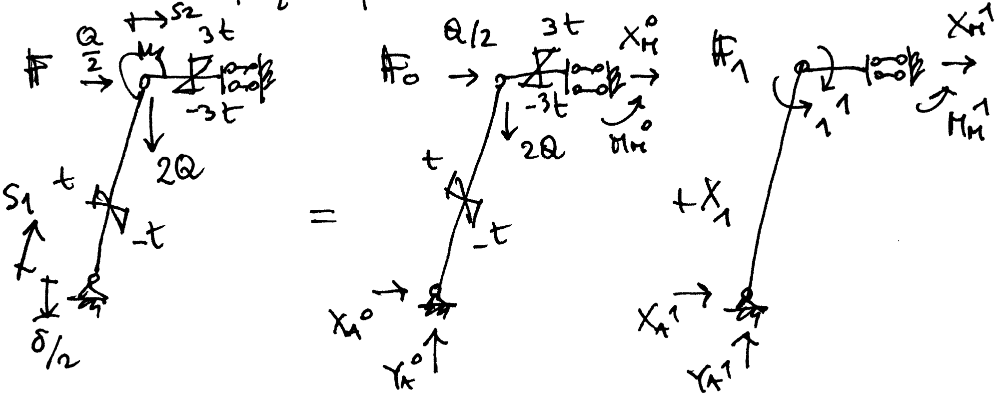


$\sin\alpha = \frac{\sqrt{17}}{17}$

$\cos\alpha = 4\frac{\sqrt{17}}{17}$



Sistema simmetrico: la parte BEN è stat. determinata, quindi considero solo la forza $pa = 2Q$ trasmessa in B.



Reazioni vincolari in F_0:

$X_A^0 = \frac{Q}{2}$, $Y_A^0 = 2Q$, $X_M^0 = Q$, $M_M^0 = 0$.

CdS:

$N_{AB}^0(s_1) = -\frac{\sqrt{17}}{2}Q$, $T_{AB}^0(s_1) = 0$, $M_{AB}^0(s_1) = 0$;

$N_{BM}^0(s_2) = -Q$, $T_{BM}^0(s_2) = 0$, $M_{BM}^0(s_2) = 0$

Misure di deformazione (curvature):

$\chi_{AB}^0(s_1) = -\frac{2\alpha t}{h}$, $\chi_{BM}^0(s_2) = -\frac{6\alpha t}{h}$.

Reazioni vincolari in F_1:

$X_A^1 = -\frac{1}{4a}$, $Y_A^1 = 0$, $X_M^1 = \frac{1}{4a}$, $M_M^1 = 1$.

CdS:

$N_{AB}^1(s_1) = \frac{\sqrt{17}}{4\cdot 17a}$, $T_{AB}^1(s_1) = \frac{\sqrt{17}}{17a}$, $M_{AB}^1(s_1) = \frac{\sqrt{17}}{17}\frac{s_1}{a}$;

$N_{BM}^1(s_2) = \frac{1}{4a}$, $T_{BM}^1(s_2) = 0$, $M_{BM}^1(s_2) = 1$.

MdD (curvature):

$\chi_{AB}^1(s_1) = \frac{\sqrt{17}}{17}\frac{s_1}{aEJ}$, $\chi_{BM}^1(s_2) = \frac{1}{EJ}$.

Eq. di Müller-Breslau: $\quad \eta_1 = \eta_{10} + X_1 \eta_{11}$

dove $\eta_1 = -\dfrac{X_1}{k_0}$ e dal TLV

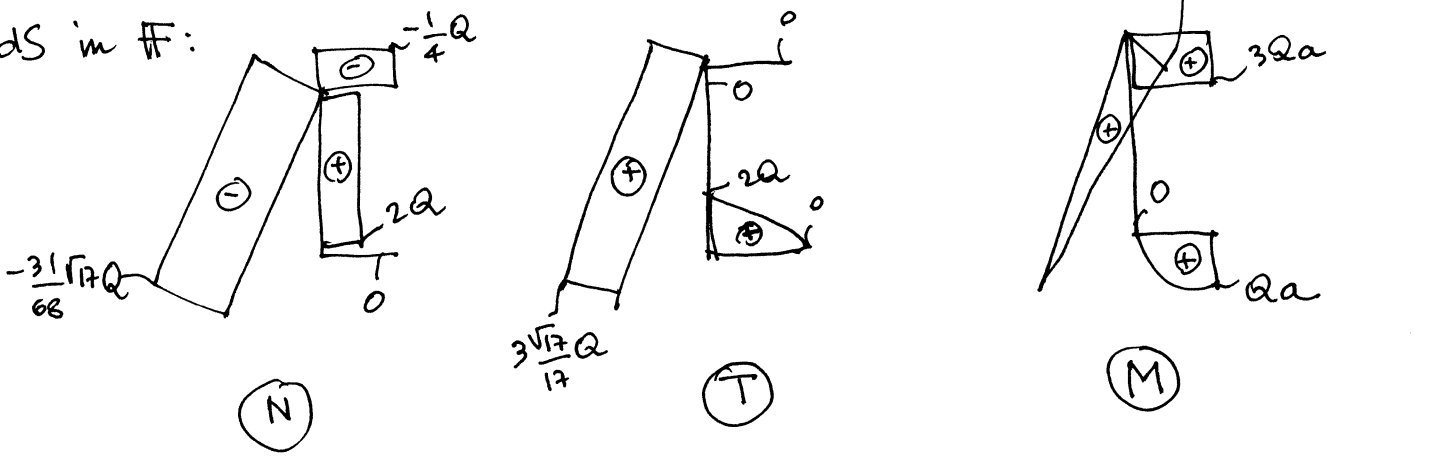
$$\mathcal{L}_e^{1\to 0} = 1\cdot\eta_{10} + \underbrace{Y_A^1}_{=0}\left(-\frac{\delta}{2}\right) = \mathcal{L}_i^{1\to 0} = \int_0^{\sqrt{17}a} \frac{\sqrt{17}}{17}\frac{s_1}{a}\left(-\frac{2\alpha t}{h}\right) ds_1 + \int_0^a 1\left(-\frac{6\alpha t}{h}\right) ds_2 = -(\sqrt{17}+6)\frac{\alpha t a}{h}$$

$$\mathcal{L}_e^{1\to 1} = 1\cdot\eta_{11} = \mathcal{L}_i^{1\to 1} = \int_0^{\sqrt{17}a}\left(\frac{\sqrt{17}}{17}\frac{s_1}{a}\right)^2 \frac{ds_1}{EJ} + \int_0^a 1^2\frac{ds_2}{EJ} = \frac{\sqrt{17}+3}{3}\frac{a}{EJ}$$

da cui

$$X_1 = \frac{(6+\sqrt{17})\,\dfrac{\alpha t a}{h}}{\dfrac{3+\sqrt{17}}{3}\dfrac{a}{EJ} + \dfrac{1}{k_0}} = \underset{\text{(sost. valori indicati)}}{\cdots} = 3Qa\,.$$

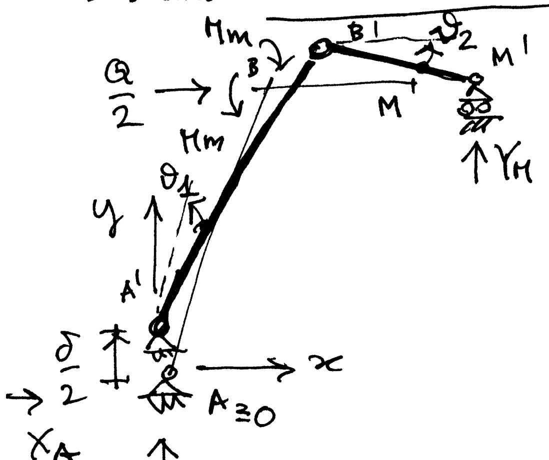
CdS in F:



Spostam. (verticale) di N:

$$v_N = \frac{\delta}{2} + \frac{6Qa}{EA} + \frac{5Qa^3}{12EJ} = \cdots = \frac{377}{12\,000}a\,.$$

Sistema antisimmetrico:



$u_A = \dfrac{\delta}{2}j \qquad u_M = u_M i$

$$u_B = u_A + k\,\vartheta_1 \times a(i+4j) = u_M + k\,\vartheta_2 \times a(-i)$$

$$\Rightarrow \vartheta_2 = -\vartheta_1 - \frac{\delta}{2a}$$

$$\mathcal{L}_e = Y_A j\cdot u_A + \frac{Q}{2}i\cdot u_B + M_m\vartheta_1 + (-M_m)\vartheta_2 =$$

$$= \cdots = \frac{\delta}{2}\left(Y_A + \frac{M_m}{a}\right) + 2\vartheta_1(M_m - Qa) = 0 \quad \forall \delta, \vartheta_1$$

$$\Rightarrow M_m = Qa, \quad Y_A = -Q\,.$$