

ESERCITAZIONE 6: STATICA



DATI: L, F, K, l_0

l_0 LUNGHEZZA DELLA MEMBRATURA (NO FORZE APPLICATE)

1) TROVARE LE REAZIONI DI EQUILIBRIO E LE REAZIONI INTERNE A CENA

2) TROVARE LE AZIONI INTERNE $l_0 = \frac{1}{2}$, $F = KL$

$N^o \text{ nodi} = 2$ $N^o \text{ mem} = 2 \times 3 = 6$ $N^o \text{ vincl} = 2 \times 3 = 6$ $N^o \text{ vincl} = 2 \times 3 = 6$ $N^o \text{ vincl} = 2 \times 3 = 6$



$\Delta l = \frac{F \cdot l}{K}$ $F = K \Delta l$

$\Delta l > 0$ la molla e' in tensione

$\Delta l < 0$ la molla e' in compressione

$\Delta l = l - l_0$



$l = x_B = L \cos \theta + L \sin \theta = 2L \cos \theta$

$\Delta l = l - l_0 = 2L \cos \theta - l_0$

$F_c = K \Delta l = K(2L \cos \theta - l_0)$



6 eq (eq. condizionali)
5 unknown (reactions)
1 per eq.

$\sum M_A = 0$ $F \cdot h \sin \theta - V_B \cdot 2L \cos \theta = 0$ $V_B = \frac{F \cdot h \sin \theta}{2L \cos \theta}$

$\sum F_x = 0$ $H_A + F = 0$ $H_A = -F$

$\sum F_y = 0$ $-V_A - V_B = 0$ $V_A = -V_B = -\frac{F \cdot h \sin \theta}{2L \cos \theta} = V_A$



$V_{C1} + V_{C2} = 0$
 $H_{C1} + F + H_{C2} = 0$
 $H_{C1} = -F - H_{C2}$

$\sum M_C = 0$ $(F_c) \cdot L \sin \theta - (V_B) \cdot L \cos \theta = 0$
 $K(2L \cos \theta - l_0) \sin \theta - \frac{F \cdot h \sin \theta}{2L \cos \theta} \cdot L \cos \theta = 0$
 $K(2L \cos \theta - l_0) - \frac{F}{2} = 0$

$\cos \theta = \frac{2KL + F}{4KL} \rightarrow \theta$

2) AZIONI INTERNE $l_0 = \frac{1}{2}$ $F = KL \rightarrow \cos \theta = \frac{2KL + KL}{4KL} = \frac{3}{4}$
 $\theta = 60^\circ$



$F_c = K(2L \cos \theta - \frac{1}{2}) = \frac{KL}{2}$
 $H_A = -F = -KL$
 $V_A = -\frac{F}{2} \tan \theta = -\frac{KL \sqrt{3}}{2}$
 $V_B = \frac{F}{2} \tan \theta = \frac{KL \sqrt{3}}{2}$



$\sum F_x = 0$ $-N - \frac{KL}{2} \cos 60^\circ - \frac{KL \sqrt{3}}{2} \sin 60^\circ = 0$
 $N = -KL$

$\sum F_y = 0$ $T + \frac{KL}{2} \sin 60^\circ - \frac{KL \sqrt{3}}{2} \cos 60^\circ = 0$
 $T = 0$

$\sum M = 0$ $M = 0$

