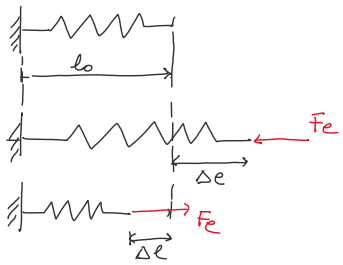
Oscillazioni - introduzione

venerdì 6 dicembre 2024 12:21

MOLLE

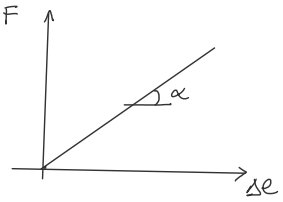
a) elem. conservativo

b) risponde a deformazioni $\Rightarrow \Delta l$



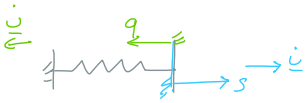
Eq^NE COSTITUTIVA

MOLLE LINEARI $\quad F_e \propto \Delta l \quad \Rightarrow \quad \boxed{F_e = k\,\Delta l}$



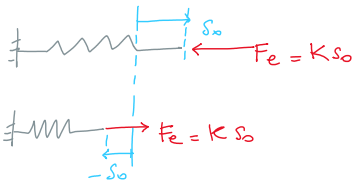
k = COSTANTE ELASTICA $= \tan\alpha$

(N/m)



$s=0 \Rightarrow$ CONFIG. RIPOSO

$\Rightarrow$ MOLLA SCARICA

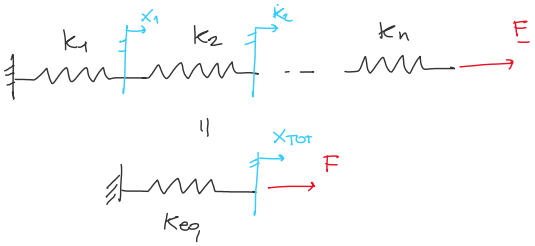


$\underline{F_e} = -k s_0 \underline{\dot{\iota}}$

$\underline{F_e} = -k(-s_0)\underline{\dot{\iota}} = k s_0 \underline{\dot{\iota}}$ $\quad (s_0 < 0)$

$\underline{F_e} = -k q \underline{\dot{\iota}}$

MOLLE IN SERIE



$F_i = k_i x_i = F$

$F = k_1 x_1 \qquad x_1 = F/k_1$

$F = k_2 x_2 \qquad x_2 = F/k_2$

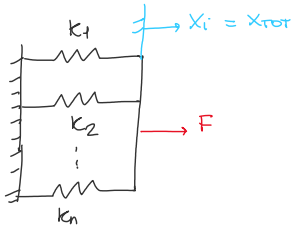
$x_{TOT} = x_1 + x_2 + \dots x_n$

$\Rightarrow \quad F = k_{eq} x_{TOT}$

$= k_{eq}\left(\frac{F}{k_1} + \frac{F}{k_2} + \dots \frac{F}{k_n}\right)$

$$\left\| \frac{1}{k_{eq}} = \frac{1}{k_1} + \frac{1}{k_2} \dots + \frac{1}{k_n} \right\|$$

MOLLE IN PARALLELO



$F = k_{eq} x_{TOT} = k_{eq} x_i$

$F = F_1 + F_2 \dots + F_n$

$= k_1 x_1 + k_2 x_2 \dots + k_n x_n$

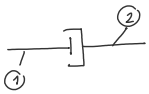
$= (k_1 + k_2 \dots k_n)\, x_{TOT}$

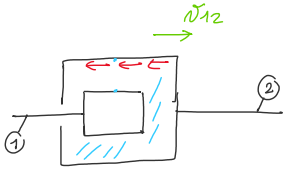
$$\| k_{eq} = k_1 + k_2 + \dots k_n \|$$

SMORZATORE

•) el. dissipativo

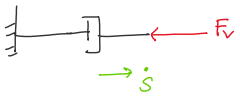
•) Risponde a "velocità"



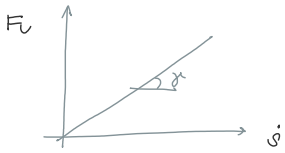


SMORZATORE LINEARE ⇒ $F_v = c\,\dot{s}$

$\underline{F_v} = -c\,\dot{s}\,\underline{i}$

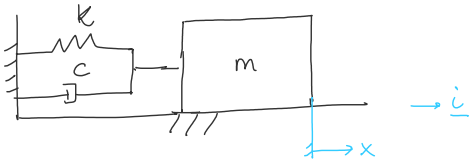


c - SMORZAMENTO VISCOSO ⇒ $\left(\frac{Ns}{m}\right)$

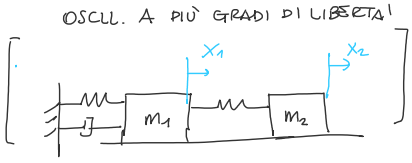


$tg\,\gamma = c$

MASSA – MOLLA – SMORZATORE ⇒ OSCILLAZIONI A 1 GDL

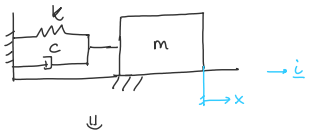


OSCILL. A PIÙ GRADI DI LIBERTÀ



x(t)? ⇒ EQUILIBRIO IN DIREZIONE $\underline{i}$

OSCILL.
- LIBERE
- FORZATE



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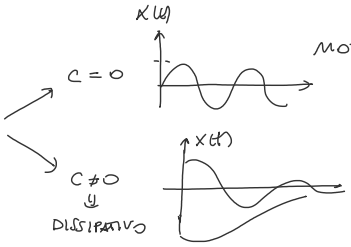
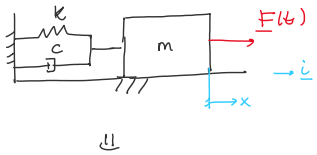
OSCILLAZ. INDOTTE DALLE CONDIZIONI INIZIALI

⇒ PERTURBAZIONE DELLA COND. DI RIPOSO

$\begin{cases} x(0) \neq 0 \\ \dot{x}(0) \neq 0 \end{cases}$ e/o





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OSCILLAZIONI CAUSATE DA FORZA ESTERNA

Ω = PULSAZIONE DELLA FORZANTE

$F(t) = F_0 \cos(\Omega t)$ / $F_0 \Omega^2 \cos(\Omega t)$

F(t) – FORZANTE ARMONICA

"ECCITATRICE"