$$L = \phi^T M T = \underbrace{\begin{pmatrix} \phi_1 & \phi_2 \end{pmatrix}}_{\phi^T} \underbrace{\begin{bmatrix} M_1 & 0 \\ 0 & M_2 \end{bmatrix}}_{M} \underbrace{\begin{Bmatrix} 1 \\ 1 \end{Bmatrix}}_{T}$$

$$\begin{pmatrix} \phi_1 & \phi_2 \end{pmatrix} \begin{Bmatrix} M_1 \\ M_2 \end{Bmatrix} = M_1 \phi_1 + M_2 \phi_2$$

$$m = \phi^T M \phi = \begin{pmatrix} \phi_1 & \phi_2 \end{pmatrix} \begin{bmatrix} M_1 & 0 \\ 0 & M_2 \end{bmatrix} \begin{Bmatrix} \phi_1 \\ \phi_2 \end{Bmatrix}$$

$$\begin{pmatrix} \phi_1 & \phi_2 \end{pmatrix} \begin{Bmatrix} M_1 \phi_1 \\ M_2 \phi_2 \end{Bmatrix}$$

$$m = M \phi_1^2 + M_2 \phi_2^2$$

$$K = \phi^T K \phi = \begin{vmatrix} \phi_1 & \phi_2 \end{vmatrix} \begin{vmatrix} K_{11} & K_{12} \\ K_{21} & K_{22} \end{vmatrix} \begin{Bmatrix} \phi_1 \\ \phi_2 \end{Bmatrix}$$

$$\begin{pmatrix} \phi_1 & \phi_2 \end{pmatrix} \begin{Bmatrix} K_{11} \phi_1 + K_{12} \phi_2 \\ K_{21} \phi_1 + K_{22} \phi_2 \end{Bmatrix}$$

$$k = K_{11} \phi_1^2 + K_{12} \phi_1 \phi_2 + K_{21} \phi_1 \phi_2 + K_{22} \phi_2^2$$

$$\phi = \begin{Bmatrix} 1 \\ 2 \end{Bmatrix} \qquad \Phi = \alpha \begin{Bmatrix} 1 \\ 2 \end{Bmatrix}$$

$$L = \phi^T M T = \alpha \begin{pmatrix} \phi_1 & \phi_2 \end{pmatrix} \begin{bmatrix} M_1 & 0 \\ 0 & M_2 \end{bmatrix} \begin{Bmatrix} 1 \\ 1 \end{Bmatrix}$$

$$L(\alpha\phi) = \alpha L(\phi)$$

$$m = \phi^T M \phi = \begin{pmatrix} \phi_1 & \phi_2 \end{pmatrix} \begin{bmatrix} M_1 & 0 \\ 0 & M_2 \end{bmatrix} \begin{Bmatrix} \phi_1 \\ \phi_2 \end{Bmatrix}$$

$$m(\alpha\phi) = \alpha \phi^T M \phi \alpha = \alpha^2 m(\phi)$$

$$k(\alpha\phi) = \alpha \phi^T k \phi \alpha - \alpha^2 k(\phi)$$

$$T(\phi) = 2\pi \sqrt{\frac{m(\phi)}{k(\phi)}} \qquad T(\alpha\phi) = 2\pi \sqrt{\frac{\cancel{\alpha^2} m(\phi)}{\cancel{\alpha^2} k(\phi)}}$$

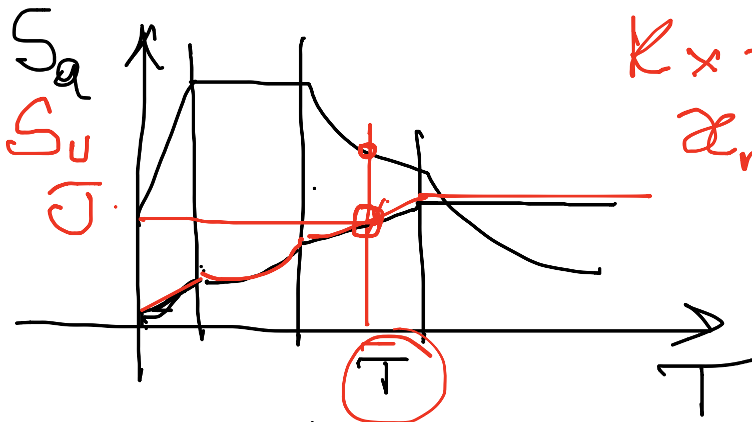
$$U_{max} \equiv \overline{U}$$

$$L(\phi) \qquad L(\alpha\phi) = \alpha L(\phi)$$

$$\Gamma(\phi) = \frac{L(\phi)}{m(\phi)} \qquad \Gamma(\alpha\phi) = \frac{\cancel{\alpha} L(\phi)}{\alpha^{\cancel{2}} m(\phi)} =$$

$$= \frac{1}{\alpha} \Gamma(\phi)$$

Se assoggetto la struttura ad un accelerogramma che ha lo spettro di risp.



$K x = m S_a$

$x_{max} = \frac{m}{K} S_a$

noti m e $K \Rightarrow \omega^2 = \frac{K}{m} \Rightarrow \bar{T} = \frac{2\pi}{\sqrt{\omega^2}}$

$\bar{U} = U(\bar{T}) \Longrightarrow \quad y = U \cdot \phi \Rightarrow \bar{y} = \bar{U} \cdot \phi$

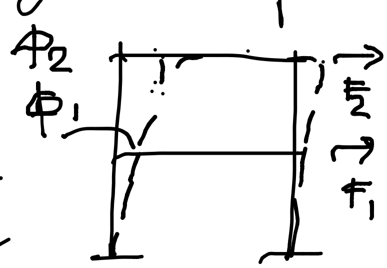
$\bar{x} = \phi \cdot \bar{y} = \begin{Bmatrix} \phi_1 \\ \phi_2 \end{Bmatrix} \bar{U} \phi$

$\bar{x} = \alpha \phi \quad \bar{y}(\alpha) = \quad = \alpha \begin{Bmatrix} \phi_1 \\ \phi_2 \end{Bmatrix} \bar{U} \frac{1}{\alpha} \phi (\phi)$

Come scegliere ϕ?

$F = K x$

$x = K^{-1} F$



$m_2 acc_2 \quad \xrightarrow{F_2}$

$m_1 acc_1 \quad \xrightarrow{F_1}$

$k = \phi^T K \phi$