

PROPRIETA'

(I) A e' a PDF $\Rightarrow A[k]$ e' a PDF per $k=1, \dots, n$

(II) A e' a PDF $\Rightarrow \det A \neq 0$

(dim: (I) ovvio dalla def; (II) si dim che PDF $\Rightarrow \ker A = \{0\} \dots$)

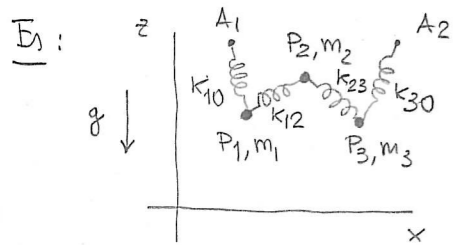
Allora: (I) + (II): A e' a PDF $\Rightarrow \det A[k] \neq 0, k=1, \dots, n-1$
 q.d' (tes ris def EG): EG e' def in A .

② SDP def: $A \in \mathbb{R}^{n \times n}$ e' SDP se $\begin{cases} A \text{ e' simm (} A^T = A \text{)} \\ \forall v \neq 0, Av \cdot v > 0 \\ \text{(ps canonico in } \mathbb{R}^n \text{)} \end{cases}$

Es: $\alpha I \in \mathbb{R}^{n \times n}, \alpha \in \mathbb{R}$, e' simm $\forall \alpha$; $v^T \alpha v = \alpha \|v\|^2$;
 αI e' SDP $\Leftrightarrow \alpha > 0$ (ris gen: diag $(\alpha_1, \dots, \alpha_n)$ e'
 SDP $\Leftrightarrow \alpha_1 > 0, \dots, \alpha_n > 0$)

$\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \in \mathbb{R}^{2 \times 2}$ e' simm; $v^T \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} v = 2v_1 v_2$ e q.d' ... non e' SDP.

Oss: $A e_k \cdot e_k = e_k^T A e_k = a_{kk}$, percio': A SDP $\Rightarrow a_{kk} > 0, k=1, \dots, n$.



$A_i \equiv (\alpha_i, \beta_i)$
 $P_j \equiv (x_j, z_j)$; $k_{ij} > 0, g > 0, m_j > 0$

Eq per l'equilibrio (eq di Newton):

$$\underbrace{\begin{bmatrix} k_{10} + k_{12} & -k_{12} & 0 \\ -k_{12} & k_{12} + k_{23} & -k_{23} \\ 0 & -k_{23} & k_{23} + k_{30} \end{bmatrix}}_{C \in \mathbb{R}^{3 \times 3}} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} k_{10} \alpha_1 \\ 0 \\ k_{30} \alpha_2 \end{bmatrix} \quad \text{proiez lungo} \\ \text{asse } x$$

$$C \begin{bmatrix} z_1 \\ z_2 \\ z_3 \end{bmatrix} = \begin{bmatrix} k_{10} \beta_1 - m_1 g \\ -m_2 g \\ k_{30} \beta_2 - m_3 g \end{bmatrix} \quad \text{proiez lungo} \\ \text{asse } z$$

Oss: i' due sistemi hanno la stessa matrice.

... C e' SDP (vero sempre per sist di masse e molle)

(dim: dalla def: $Cv \cdot v = \dots$)

PROPRIETA'

(I) A e' SDP $\Rightarrow A[k]$ e' SDP, $k=1, \dots, n$

(II) A e' SDP $\Rightarrow \det A \neq 0$

(dim: (I) no, (II) $Ax=0 \Rightarrow Ax \cdot x = 0 \dots$)

Allora: (I) + (II) A e' SDP $\Rightarrow \det A[k] \neq 0$ per $k=1, \dots, n-1$
 q.d' (tes ris def EG): EG e' def in A

Oss:

