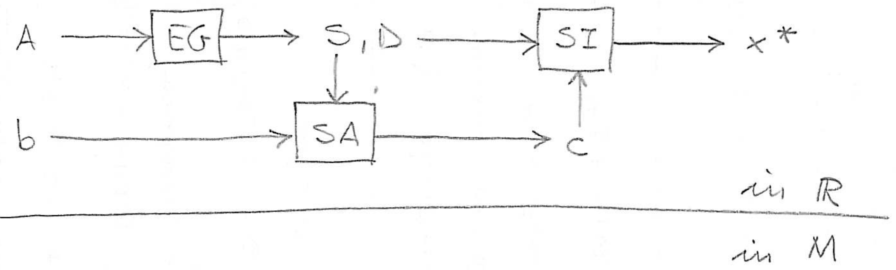
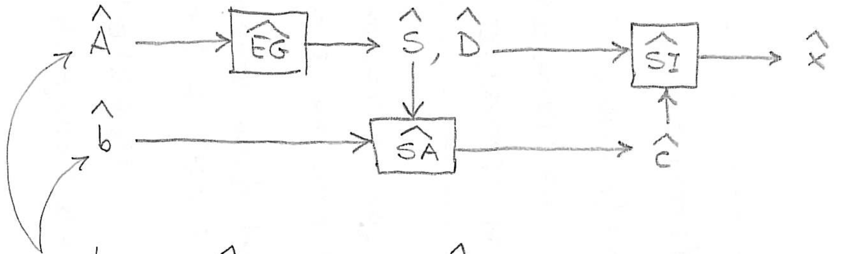
* STUDIO IN $\mathcal{M}$ *

Oss:





ad es: $\hat{A} = rd(A)$, $\hat{b} = rd(b)$

$\hat{x} = \widehat{SI}(\hat{D}, \hat{c})$, $x^* = SI(D, c)$; $\tilde{x} = SI(\hat{D}, \hat{c})$

$$\Rightarrow \frac{\|\hat{x} - x^*\|}{\|x^*\|} \le \underbrace{\frac{\|\hat{x} - \tilde{x}\|}{\|\tilde{x}\|}}_{\epsilon_a} \frac{\|\tilde{x}\|}{\|x^*\|} + \underbrace{\frac{\|\tilde{x} - x^*\|}{\|x^*\|}}_{\epsilon_d}$$

$$\frac{\|\tilde{x}\|}{\|x^*\|} \le \frac{\|\tilde{x} - x^*\|}{\|x^*\|} + 1$$

$$\le \epsilon_a (1 + \epsilon_d) + \epsilon_d = \epsilon_a + \epsilon_d + \epsilon_a \epsilon_d$$

$$\epsilon_D = \frac{\|\hat{D} - D\|}{\|D\|}$$

$$\epsilon_c = \frac{\|\hat{c} - c\|}{\|c\|}$$

Supponendo ϵ_a piccolo...

> TEO (condiz, I) + TEO (condiz, II) $\Rightarrow$
>
> - $\epsilon_d \le c(D)\, \epsilon_c \quad (\epsilon_D = 0)$
> - $\hat{\epsilon}_d \le c(D)\, \epsilon_D \quad (\epsilon_c = 0)$
>
> $\Rightarrow$ occorre studiare $c(D)$!

Es: $\gamma \in (0,1)$, $A(\gamma) = \begin{bmatrix} \gamma & 1 \\ 1 & 0 \end{bmatrix}$, $A^{-1}(\gamma) = \begin{bmatrix} 0 & 1 \\ 1 & -\gamma \end{bmatrix}$

- $c_\infty(A(\gamma)) = (1+\gamma)^2 < 4$ (numero di condiz <u>basso</u>)
- EG ... $S(\gamma) = \begin{bmatrix} 1 & 0 \\ 1/\gamma & 1 \end{bmatrix}$, $D(\gamma) = \begin{bmatrix} \gamma & 1 \\ 0 & -1/\gamma \end{bmatrix}$
- $c_\infty(D(\gamma)) \ge \frac{1}{\gamma^2} \Rightarrow$ <u>NON LIMITATO</u> per $\gamma \in (0,1)$

$$= \underbrace{\max\left\{1+\gamma, \frac{1}{\gamma}\right\}}_{\ge \frac{1}{\gamma}} \underbrace{\max\left\{1 + \frac{1}{\gamma}, \gamma\right\}}_{\ge 1 + \frac{1}{\gamma} \ge \frac{1}{\gamma}}$$

> ovvero... i sistemi $A(\gamma)x = b$ e $D(\gamma)x = c$ sono equivalenti <u>MA</u> non hanno le stesse proprietà di condizionamento !!

Oss: EGPP (EG con Pivoting Parziale)

"al passo k, si utilizza come pivot: $\max_{i \ge k} |a_{ik}^{(k)}|$"