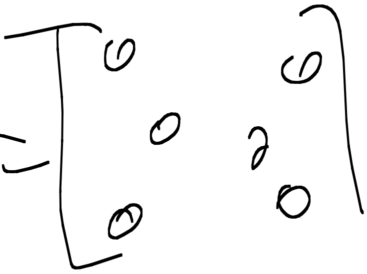
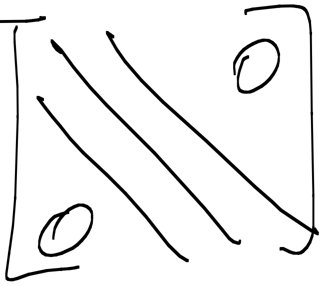
ELIMINAZIONE GAUSS CON MATRICI SPARSE

$A =$ 

$nnz(A) =$ # elementi $\neq 0$

$$nnz(A) \ll n^2$$

$A =$ 

Tridiagonali

$$nnz(A) = n + 2(n-1) = O(n)$$

$$A_0 = \begin{bmatrix} \alpha_1^0 & \beta_1^0 & 0 \\ \gamma_1^0 & \alpha_2^0 & \beta_2^0 \\ 0 & \gamma_2^0 & \alpha_3^0 \end{bmatrix} \qquad m = \frac{\gamma_1^0}{\alpha_1^0}$$

$$E_0 = \begin{bmatrix} 1 & & \\ -m & 1 & \\ 0 & 0 & 1 \end{bmatrix}$$

$$E_0 A_0 = \begin{bmatrix} \alpha_1^0 & \beta_1^0 & \\ 0 & \alpha_2^{(1)} & \beta_2^{(0)} \\ 0 & \gamma_2^{(0)} & \alpha_3^{(0)} \end{bmatrix}$$

$$0 = -m\,\alpha_1^{(0)} + \gamma_1^{(0)}$$

$$\alpha_2^{(1)} = \alpha_2^{(0)} - m\,\beta_1^{(0)}$$

$$A = \begin{bmatrix} \alpha_1 & \beta_1 & & \\ \gamma_1 & \ddots & \ddots & \\ & \ddots & \ddots & \beta_{n-1} \\ & & \gamma_{n-1} & \alpha_n \end{bmatrix}$$

for $k = 1 : n-1$

$\quad m = \dfrac{\gamma_k}{\alpha_k}$;

$\quad \alpha_{k+1} = \alpha_{k+1} - m\,\beta_k$;

end

$$U = \begin{bmatrix} \alpha_1 & \beta_1 & & \\ & \ddots & \ddots & \\ & & \ddots & \beta_{n-1} \\ & & & \alpha_n \end{bmatrix} \qquad L = \begin{bmatrix} 1 & & & \\ m_1 & 1 & & \\ & m_2 & \ddots & \\ & & m_{n-1} & 1 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & x_1 & \dots & x_{n-1} \\ x_1 & \ddots & & 0 \\ \vdots & & \ddots & \\ x_{n-1} & 0 & & 1 \end{bmatrix}$$

$\mathrm{nnz}(A) = n + 2(n-1)$

$$E_0 = \begin{bmatrix} 1 & & & \\ -x_1 & \ddots & & \\ -x_2 & & \ddots & \\ \vdots & & & \\ -x_{n-1} & & & 1 \end{bmatrix} \qquad E_0 A = \begin{bmatrix} x & x & \dots & x \\ 0 & x & \dots & x \\ \vdots & \vdots & & \vdots \\ 0 & x & \dots & x \end{bmatrix}$$

$\mathrm{nnz}(A_1) = O(n^2)$ –

"fill in"

"Pagerank" Google

'