Note Title 2021-11-11

$$A = \begin{bmatrix} a_{11} & & 0 \\ & \ddots & \\ 0 & & a_{nn} \end{bmatrix} - \begin{bmatrix} 0 & & & 0 \\ -a_{21} & \ddots & & \\ \vdots & & \ddots & \\ -a_{n1} & \cdots & -a_{n,n-1} & 0 \end{bmatrix} - \begin{bmatrix} 0 & -a_{12} & \cdots & -a_{1n} \\ & \ddots & \ddots & \vdots \\ & & & -a_{n-1,n} \\ 0 & & & 0 \end{bmatrix}$$

$$\underbrace{}_{D} \qquad \underbrace{}_{E} \qquad \underbrace{}_{F}$$

$$\boxed{x^{(k+1)} = M^{-1}\left(b + N x^{(k)}\right)}$$

Jacobi: $M = D$, $N = E + F$

Gauss-Seidel $M = D - E$, $N = F$.

$$\boxed{x_i^{(k+1)} = \frac{b_i - \sum_{j=1, j\neq i}^{n} a_{ij} x_j^{(k)}}{a_{ii}} \qquad i = 1, \dots, n}$$

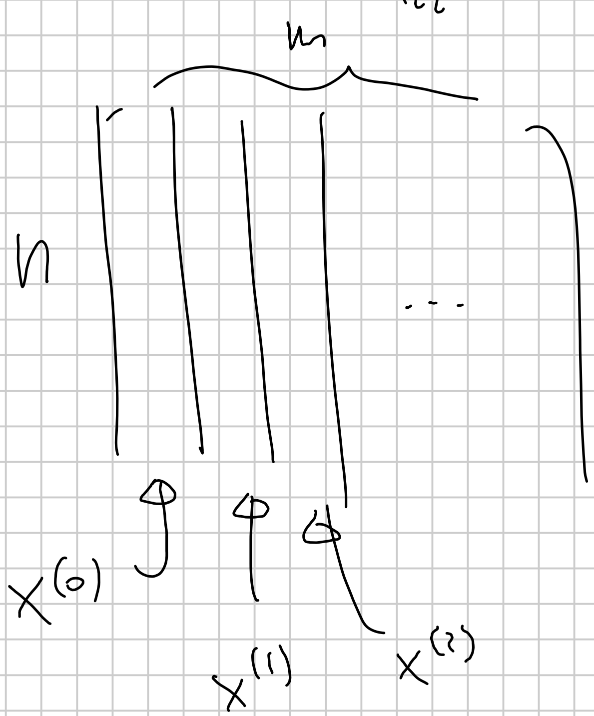
$\rightsquigarrow$ 1 iterazione : $x^{(k)} \to x^{(k+1)}$

function x = jacobi(A, b, x0, m)

$\hookrightarrow$ numero di passi (fissato)

+ visualizzare a schermo la norma $\| x^{(k-1)} - x^{(k)} \|$

$$x_2^{(1)} = \frac{b_2 - A_{21} x_1^{(0)} \quad A_{23} x_3^{(0)}}{A_{22}} = \frac{1 - 4 \cdot 2 - 6 \cdot 4}{5} = \frac{-31}{5}$$



utilizzo x "vecchio"

per calcolare x "nuovo"

xnew

xold

$k=1$	$k=2$	$k=3$ ...
usiamo x_0 per costruire $x^{(1)}$	uso x_1 per costruire x_2	
$xold = x^{(0)}$	$xold = x^{(1)}$	$xold = x^{(2)}$
$xnew = x^{(1)}$	$xnew = x^{(2)}$	$xnew = x^{(3)}$

Provate:

1) metodo di Gauss-Seidel
2) verificare convergenza lineare
3) aggiungere criterio di arresto.