

Zeitation 13 del 26/04/2021

Titolo nota

26/04/2021

$$E_s: A = \begin{pmatrix} 3 & 0 & 4 \\ 7 & 4 & 2 \\ -1 & -1 & -2 \end{pmatrix}$$

$$\underline{x} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

$$\underline{b} = \begin{pmatrix} 4 \\ 13 \\ -4 \end{pmatrix}$$

$\rho(B_J) > 1 \Rightarrow$ il metodo di Jacobi non converge

$\rho(B_{GS}) < 1 \Rightarrow$ il metodo di Gauss-Seidel converge

\mathcal{E}_2 :

$$A = \begin{pmatrix} -3 & 3 & -6 \\ -4 & 4 & -8 \\ 5 & 4 & -9 \end{pmatrix}$$

$$\underline{x} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

$$\underline{b} = \begin{pmatrix} -6 \\ -5 \\ 3 \end{pmatrix}$$

$$\rho(A) = 10^{-6}$$

$\rho(B_J) < 1 \Rightarrow$ Jacobi converge in 68 iterations

$\rho(B_{GS}) > 1 \Rightarrow$ G.S. non converge

\mathcal{E}_3 :

$$A = \begin{pmatrix} 4 & 1 & 1 \\ 2 & -9 & 0 \\ 0 & -8 & -6 \end{pmatrix}$$

$$\underline{x} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

$$\underline{b} = \begin{pmatrix} 6 \\ -7 \\ -14 \end{pmatrix}$$

$$\rho(B_J) \approx 0.44 < 1$$

\Rightarrow good convergence in 21 iterations

$$\rho(B_{GS}) \approx 0.02 < 1$$

\Rightarrow G.S. convergence in 5 iterations

Ex.:

$$A = \begin{pmatrix} 7 & 6 & 9 \\ 4 & 5 & -4 \\ -7 & -3 & 8 \end{pmatrix}$$

$$\underline{x} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

$$\underline{b} = \begin{pmatrix} 22 \\ 5 \\ -2 \end{pmatrix}$$

$$\rho(B_J) \approx 0.6411 < 1 \Rightarrow \text{convergence in 39 iterations}$$

$$\rho(B_{GS}) \approx 0.7746 < 1 \Rightarrow \text{GS convergence in 65 iterations}$$

