

YearOne 13 del 26/04/2021

Titolo nota

26/04/2021

$$\text{E.s.: } A = \begin{pmatrix} 3 & 0 & 4 \\ 4 & 4 & 2 \\ -1 & -1 & -2 \end{pmatrix}$$

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

$$\underline{b} = \begin{pmatrix} 4 \\ 4 \\ -1 \end{pmatrix}$$

$\int (\beta_{GS}) > 1 \Rightarrow$  il metodo di Gauss-Seidel non converge

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

Es.

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

$$\alpha = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

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

$$\kappa_{\text{rel}} = 10^{-6}$$

$$\rho(B_J) < 1$$

$\Rightarrow$  Jacobi converge in 68 iteration

$$\rho(B_{GS}) > 1$$

$\Rightarrow$  G.S. won't converge

Es.:

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

$$\alpha = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

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

$$\rho(B_5) \approx 0.44 < 1$$

$\Rightarrow$  G.S. converge in 1 iteration

$$\rho(B_5) \approx 0.09 < 1$$

$\Rightarrow$  G.S. converge in 5 iterations

$$\rho(B_{GS}) \approx 0.09 < 1$$

$\Rightarrow$  G.S. converge in 5 iterations

G.S.:

$$A = \begin{pmatrix} 4 & 6 & 9 \\ 4 & 5 & -4 \\ -7 & -3 & 0 \end{pmatrix}$$

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

$$b = \begin{pmatrix} 2 \\ 2 \\ -2 \end{pmatrix}$$

$\Rightarrow$  converge in 39 iterations

$$\rho(B_J) \approx 0.6111 < 1 \Rightarrow$$

$$\rho(B_{GS}) \approx 0.7746 < 1 \Rightarrow$$

G.S converge in 65 iterations

