$$C \approx \frac{\| x_k - x_{k-1} \|_\infty}{\| x_{k-1} - x_{k-2} \|_\infty}$$

$$C \approx \frac{\| x_2 - x_1 \|_\infty}{\| x_1 - x_0 \|_\infty} = \frac{-\frac{1}{8} + \frac{11}{4}}{-\frac{11}{4} - 0}$$

$$A = \begin{bmatrix} -4 & -1 & 0 \\ -1 & -4 & -1 \\ 0 & -1 & -4 \end{bmatrix}, \quad b = \begin{bmatrix} 3 \\ 4 \\ 10 \end{bmatrix}$$

$$x^{(0)} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

diagonal -4's should be positive

consequently all results are correct but need to be positive

$$x^{(1)} = -\frac{1}{4}\left[\begin{pmatrix} -1 \cdot 0 & + & 0 \cdot 0 \\ -1 \cdot 0 & + & -1 \cdot 0 \\ 0 \cdot 0 & + & -1 \cdot 0 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \\ 10 \end{pmatrix}\right]$$

$$= -\frac{1}{4}\left[\begin{pmatrix} 0 + 0 \\ 0 + 0 \\ 0 + 0 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \\ 10 \end{pmatrix}\right]$$

$$= -\frac{1}{4}\begin{bmatrix} 3 \\ 4 \\ 10 \end{bmatrix}$$

$$x^{(1)} = \begin{bmatrix} -3/4 \\ -1 \\ -5/2 \end{bmatrix}$$

$$x^{(2)} = -\frac{1}{4}\left[\begin{pmatrix} -1 \cdot -3/4 & + & 0 \cdot -1 \\ -1 \cdot -1 & + & -1 \cdot -5/2 \\ 0 \cdot -1 & + & -1 \cdot -5/2 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \\ 10 \end{pmatrix}\right]$$

$$= -\frac{1}{4}\left[\begin{pmatrix} 3/4 + 0 \\ 1 + 5/2 \\ 0 + 5/2 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \\ 10 \end{pmatrix}\right]$$

$$= -\frac{1}{4}\begin{bmatrix} 3/4 + 3 \\ 7/2 + 4 \\ 5/2 + 10 \end{bmatrix}$$

$$= -\frac{1}{4}\begin{bmatrix} 3/4 + 12/4 \\ 7/2 + 8/2 \\ 5/2 + 20/2 \end{bmatrix}$$

$$= -\frac{1}{4}\begin{bmatrix} 15/2 \\ 7 \\ 25/2 \end{bmatrix} = \begin{bmatrix} -15/8 \\ -7/4 \\ -25/8 \end{bmatrix}$$

CHECK $x^{(0)}$, $x^{(1)}$, $x^{(2)}$ ARE CORRECT IN CODE

GAUSS - SEIDEL

$(L + D)\, x_{k+1} = -U x_k + b$