* EUCLIDEAN NORM (l_∞)

→ l_∞ norm is called the Euclidean norm of the vector x because it represents usual notion of distance from the origin.

→ Let $x = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}$ then $\|X\|_\infty = \max\limits_{1 \le i \le n} \{|x_i|\}$

[we don't see signs, but see magnit

eg: $\{1, -2, 3, -4\}$ then $\|X\|_\infty = 4$

* GAUSS JACOBI METHOD

$$\underset{A}{\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}} \quad A = \underset{L}{\begin{bmatrix} 0 & 0 & 0 \\ a_{21} & 0 & 0 \\ a_{31} & a_{32} & 0 \end{bmatrix}} + \underset{D}{\begin{bmatrix} a_{11} & 0 & 0 \\ 0 & a_{22} & 0 \\ 0 & 0 & a_{33} \end{bmatrix}} + \underset{U}{\begin{bmatrix} 0 & a_{12} & a_{13} \\ 0 & 0 & a_{23} \\ 0 & 0 & 0 \end{bmatrix}}$$

$$x_0 = \begin{Bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{Bmatrix}$$

$$X^{(K+1)} = D^{-1}\left[B - LX^{(K)} - UX^{(K)}\right] = \left[B - LX^{(K)} - UX^{(K)}\right]/D$$

⇒ $x_1^{(K+1)} = \left[b_1 - a_{12}x_2^{(K)} - a_{13}x_3^{(K)}\right]/a_{11}$

$x_2^{(K+1)} = \left[b_2 - a_{21}x_1^{(K)} - a_{23}x_3^{(K)}\right]/a_{22}$

$x_3^{(K+1)} = \left[b_3 - a_{31}x_1^{(K)} - a_{32}x_2^{(K)}\right]/a_{33}$

* GAUSS SEIDEL METHOD

[use the updated value, otherwise same as G. Jacobi Method]

$X^{(K+1)} = D^{-1}\left[B - LX^{(K+1)} - UX^{(K)}\right]$

$x_1^{(K+1)} = \left[b_1 - a_{12}x_2^{(K)} - a_{13}x_3^{(K)}\right]/a_{11}$

$x_2^{(K+1)} = \left[b_2 - a_{21}x_1^{(K+1)} - a_{23}x_3^{(K)}\right]/a_{22}$

$x_3^{(K+1)} = \left[b_3 - a_{31}x_1^{(K+1)} - a_{32}x_2^{(K+1)}\right]/a_{33}$

* SOR METHOD

Let we have the solution of K^{th} iteration i.e $X^{(K)}$ then we find $X^{(K+1)}$ using G. seidel method. Then SOR solution of $(K+1)^{th}$ iteration as given by $X^{(K+1)} = (1-\omega)X^{(K)} + \omega X_{GS}^{(K+1)}$

where ω → relaxation parameter, $1 \le \omega \le 2$