Sistema de ecuaciones

$-8x_1 + x_2 - 2x_3 = -20$

$2x_1 - 6x_2 - x_3 = -38$

$-3x_1 - x_2 + 7x_3 = -34$

$$[a_{ij}] = \begin{bmatrix} -8 & 1 & -2 \\ 2 & -6 & -1 \\ -3 & -1 & 7 \end{bmatrix} \begin{bmatrix} a_1 \\ a_2 \\ a_3 \end{bmatrix} = \begin{bmatrix} -20 \\ -38 \\ -54 \end{bmatrix}$$

Iteracion 1

$$X_1 = \frac{-20 - 1(0) - (-2(0))}{-8} \qquad x_1 = 2,5$$

$$X_2 = \frac{-38 - (2(2,5)) - (-1(0))}{-6} \qquad x_2 = 7,1667$$

$$X_3 = \frac{-34 - (-3(2,5)) - (-1(-7,1667))}{7} \qquad x_3 = -2,7619$$

Error absoluto

$$|E_0| = \frac{2,5 - 0}{2,5} \times 100 = 100\%$$

$$E_{a_1} = \frac{7,1667 - 0}{7,1667} \times 100 = 100\%$$

$$E_{a_3} = \frac{-2,7719 - 0}{-2,7619} \times 100 = 100\%$$

Segunda iteracion.

$$x_1 = \frac{-20 - (1(7,667) - (-2(-2,761911)}{-8} = 4,0863$$

$$x_2 = \frac{-38 - (2 \cdot 4,0863) - (-1(-2,761911)}{-6} = 8,1558$$

$$x_3 = \frac{-34 - (-3 \cdot 4,0863) - (-1 \cdot 8,1558)}{7} = -19,408$$

Errores

$$E_1 = \frac{4,0863 - 2,5}{4,0863} \cdot 100 = 38,82\%$$

$$E_2 = \frac{8,1558 - 7,1667}{8,1558} \cdot 100 = 12,13\%$$

$$E_3 = \frac{-19,408 - (-27,6191)}{-19,408} \cdot 100 = 242,3\%$$

Tercera iteracion

$$x_1 = \frac{-20 - (1 \times 8,1558) - (-2 \times -1,9408)}{-8} = 4,005$$

$$x_2 = \frac{-38 - (2 \times 4,005) - (-2 \times -1,9408)}{6} = 7,492$$

$$x_3 = \frac{-34 - (-3 \cdot 4,005) - (-1 \times 7,492)}{7} = -1,999$$

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Error

$$E_a \frac{4,005 - 4,0863}{4,005} \cdot 100 = 2,03\%$$

$$E_{a2} = \frac{7,992 - 8,1558}{7,992} \cdot 100 = 2,05\%$$

$$E_{a3} = \frac{-1,999 - (-1,9408}{-1,999} \cdot 100 = 3,91\%$$