Trabajo en Clase

Ismael Santacruz

$$10x_1 - x_2 = 9$$
$$-x_1 + 10x_2 - 2x_3 = 7$$
$$-2x_2 + 10x_3 = 6$$

$$x_{k+1} = \begin{vmatrix} 1/10 & 0 & 0 \\ 0 & 1/10 & 0 \\ 0 & 0 & 1/10 \end{vmatrix} \left[\begin{pmatrix} 9 \\ 7 \\ 6 \end{pmatrix} - \begin{pmatrix} 0 & 0 & 0 \\ -1 & 0 & 0 \\ 0 & -2 & 0 \end{pmatrix} \begin{pmatrix} x_1^{k+1} \\ x_2 \\ x_3 \end{pmatrix} - \begin{pmatrix} 0 & -1 & 0 \\ 0 & 0 & -2 \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}^k \right]$$

$k=0$ $\quad it=1$

(i)

$$x_1 = \frac{9+0}{10} = 0,9 \qquad e = \left| \frac{0,9-0}{0,9} \right| \cdot 100 = 100\%$$

$$x_2 = \frac{7+0,9+0}{10} = 0,79 \qquad e = \left| \frac{0,79-0}{0,79} \right| \cdot 100 = 100\%$$

$$x_3' = \frac{6+2(0,79)}{10} = 0,758 \qquad e = \left| \frac{0,758-0}{0,788} \right| \cdot 100 = 100\%$$

$it=2$

$$x_1 = \frac{9+0,79}{10} = 0,979 \qquad e = \left| \frac{0,979-0,9}{0,979} \right| \cdot 100 = 8,069\%$$

$$x_2 = \frac{7+0,979+2(0,758)}{10} = 0,9495 \qquad e = \left| \frac{0,9495-0,79}{0,9495} \right| \cdot 100 = 16,78\%$$

$$x_3 = \frac{6+2(0,9495)+0}{10} = 0,7899 \qquad e = \left| \frac{0,7814-0,758}{0,7899} \right| \cdot 100 = 4,038\%$$

$it=3$

$$x_1 = \frac{9+0,9495}{10} = 0,99495 \qquad e = \left| \frac{0,9495-0,979}{0,9495} \right| \cdot 100 = 1,603\%$$

$$x_2 = \frac{7+0,99495+2(0,7899)}{10} = 0,957473 \qquad e = \left| \frac{0,957473-0,9495}{0,957473} \right| \cdot 100 = 0,832\%$$

$$x_3 = \frac{6 + 2(0,957478)}{10} = 0,791495$$

$$e = \left| \frac{0,791495 - 0,78949}{0,791495} \right| \cdot 100 = 2,064\,1\,\% \;//$$

Método de Cramer

$$10x_1 - x_2 = 4$$
$$-x_1 + 10x_2 - 2x_3 = 7$$
$$-2x_2 + 10x_3 = 6$$

$$\det[A] = \begin{vmatrix} 10 & -1 & 0 \\ -1 & 10 & -2 \\ 0 & -2 & 10 \end{vmatrix} =$$

$$\det \begin{pmatrix} 10 & -2 \\ -2 & 10 \end{pmatrix} = 96 \qquad \det \begin{pmatrix} -1 & -2 \\ 0 & 10 \end{pmatrix} = -10 \qquad \det \begin{pmatrix} -1 & 10 \\ 0 & -2 \end{pmatrix} = 2$$

$$\det(A) = 10 \cdot 96 - (-1)(10) + 0 \cdot 2 = 950 \;//$$

$$\frac{\Delta x_1}{\Delta} = \frac{\begin{vmatrix} 9 & -1 & 0 \\ 7 & 10 & -2 \\ 6 & -2 & 10 \end{vmatrix}}{950} = \frac{9 \cdot 10 \cdot 10 + (-1)(-2) \cdot 6 + 0 \cdot 7 \cdot (-2) - 6 \cdot 10 \cdot 0 - (-2) \cdot 9 \cdot 10 \cdot 7 \cdot (-1)}{950}$$

$$\frac{\Delta x_1}{\Delta} = \frac{946}{951} = 0,995784 \;//$$

$$\frac{\Delta x_2}{\Delta} = \frac{\begin{vmatrix} 10 & 9 & 0 \\ -1 & 7 & -2 \\ 0 & 6 & 10 \end{vmatrix}}{950} = 10 \cdot 7 \cdot 10 + 9(-2)(0) + 0(-1)(6) - 0(7)(0) - (6)(-2)(10) - 10(-1)9)$$

$$\frac{\Delta x_2}{\Delta} = \frac{910}{950} = 0,957895 \;//$$

$$\frac{D_{x3}}{D} = \frac{\begin{vmatrix} 10 & -1 & 9 \\ 1 & 10 & 7 \\ 0 & -2 & 6 \end{vmatrix}}{950} = \frac{10 \cdot 10 \cdot 6 + (-1)7 \cdot 0 + 9(-1)(-2) - 0 \cdot 10 \cdot 9 - (-2)(7)10 - 6(1)(-1)}{950} = \frac{782}{950}$$

$$\frac{D_{x3}}{D} = \frac{752}{950} = 0,791578 \;//$$

$$e_1 = \left| \frac{0,995789 - 0,495789}{0,495789} \right| \cdot 100 = 0\,\% \;//$$

$$e_2 = \left| \frac{0,957584 - 0,957589}{0,957584} \right| \cdot 100 = 0\,\% \;//$$

$$e_{x3} = \left| \frac{0,791578 - 0,791578}{0,791578} \right| \cdot 100 = 0\,\% \;//$$