Metodos Numericos

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Metodo Factorizacion LU

$$A_0 = \begin{pmatrix} 3 & -0.1 & -0.2 \\ 0.1 & 7 & -0.3 \\ 0.3 & -0.2 & 10 \end{pmatrix}$$

$l_{21} = 0.1/3$
$l_{31} = 0.3/3$
$l_{32} = -0.19/7.003$

$F_2' = F_2 - l_{21} F_1$
$F_3' = F_3 - l_{31} F_1 \Rightarrow$
$F_3'' = F_3 - F_1 l_{32}$

$$U = \begin{pmatrix} 3 & -0.1 & -0.2 \\ 0 & 7.003 & -0.306 \\ 0 & 0 & 10.000 \end{pmatrix} \quad Y \quad L = \begin{pmatrix} 1 & 0 & 0 \\ 0.1/3 & 1 & 0 \\ 0.3/3 & \frac{-0.19}{3} & 1 \end{pmatrix}$$

El nuevo sistema de ecuaciones queda como:

$$A_1' = \left(\begin{array}{ccc|c} 1 & 0 & 0 & 7.85 \\ 0.1/3 & 1 & 0 & -19.3 \\ 0.3/3 & \frac{-0.19}{3} & 1 & 71.4 \end{array}\right)$$

$x_1 = 7.85 \qquad x_2 = -19.3 - \frac{0.1}{3}(7.85) = -19.038$

$x_2 = 71.4 - 0.1(7.85) + \frac{0.19}{3}(-19.038) = 69.409$

Ahora $[L][U] \Rightarrow$

$$\left(\begin{array}{ccc|cc} 3 & -0.1 & -0.2 & -19.038 & 7.85 \\ 0 & 7.003 & -0.306 & 69.409 & -19.038 \\ 0 & 0 & 10.000 & & 69.409 \end{array}\right)$$

$F_1' = F_1 - F_2\left(\frac{-0.01}{7.003}\right) \Rightarrow \left(\begin{array}{ccc|c} 3 & 0 & -0.204 & 7.878 \\ 0 & 7.003 & -0.306 & -19.038 \\ 0 & 0 & 10.000 & 69.409 \end{array}\right)$

$F_1'' = F_1' - F_3\left(\frac{-0.204}{10.000}\right) \Rightarrow \left(\begin{array}{ccc|c} 3 & 0 & 0 & 8.993 \\ 0 & 7.003 & -0.306 & -19.038 \\ 0 & 0 & 10.000 & 69.409 \end{array}\right)$

$F_2'' = F_2' - F_3\left(\frac{-0.306}{10.000}\right) \Rightarrow \left(\begin{array}{ccc|c} 3 & 0 & 0 & 8.993 \\ 0 & 7.003 & 0 & -16.914 \\ 0 & 0 & 10.000 & 69.909 \end{array}\right)$

Dividimos
$F_1/3$
$F_2/7.003$
$F_3/10.000$

$\Rightarrow \left(\begin{array}{ccc|c} 1 & 0 & 0 & 2.997 \\ 0 & 1 & 0 & -2.415 \\ 0 & 0 & 1 & 6.9409 \end{array}\right)$

$x_1 = 2.997$
$x_2 = -2.415$
$x_3 = 6.9409$