

## Gauss

① 4 iteraciones completas utilizando Gauss.

$$\begin{aligned} 9x + 2y - z &= -2 \\ 7x + 8y + 5z &= 3 \\ 3x + 4y - 10z &= 6 \end{aligned}$$

$$\begin{aligned} -x &= -\frac{2}{9} - \frac{2}{9}y + \frac{1}{9}z \\ &= \frac{1}{9}(-2 - 2y + z) = 0 \end{aligned}$$

$$\begin{aligned} -y &= \frac{3}{8} - \frac{7}{8}x - \frac{5}{8}z \\ &= \frac{1}{8}(3 - 7x - 5z) = 0.125(3 - 7x - 5z) \end{aligned}$$

$$\begin{aligned} -z &= -\frac{6}{10} + \frac{3}{10}x + \frac{4}{10}y = -\frac{3}{5} + \frac{3}{10}x + \frac{2}{5}y \\ &= \frac{1}{5}(-3 + \frac{3}{2}x + 2y) = 0.2(-3 + 1.5x + 2y) \end{aligned}$$

Iteración I

$$\begin{aligned} x_1 &= 0.11(-2 - 2(0) + 0) = -0.22 \\ y_1 &= 0.125(3 - 7(-0.22) - 5(0)) = 0.569 \\ z_1 &= 0.2(-3 + 1.5(-0.22) + 2(0.5694)) = -0.438 \end{aligned}$$

Iteración II

$$\begin{aligned} x_2 &= 0.11(-2 - 2(0.569) + (-0.438)) = -0.397 \\ y_2 &= 0.125(3 - 7(-0.397) - 5(-0.438)) = 0.997 \\ z_2 &= 0.2(-3 + 1.5(-0.397) + 2(0.997)) = 0.3204 \end{aligned}$$

Iteración III

$$\begin{aligned} x_3 &= 0.11(-2 - 2(0.997) + (0.3204)) = -0.479 \\ y_3 &= 0.125(3 - 7(-0.479) - 5(0.3204)) = 0.994 \\ z_3 &= 0.2(-3 + 1.5(-0.479) + 2(0.997)) = -0.345 \end{aligned}$$

Iteración IV

$$\begin{aligned} x_4 &= 0.11(-2 - 2(0.994) + (0.345)) = -0.481 \\ y_4 &= 0.125(3 - 7(-0.481) + (0.994)) = 1.012 \\ z_4 &= 0.2(-3 - 1.5(-0.481) + 2(1.012)) = -0.339 \end{aligned}$$

Nombre: Ramírez Villarreal Axel

Día

Mes

Tema:

②

$$\begin{aligned} 5x_1 + 2x_2 &= 12 \\ -x_1 + 10x_2 &= 8 \end{aligned}$$

$$x_1 = \frac{12}{5} - \frac{2}{5}x_2 = \frac{1}{5}(12 - 2x_2) = 0.2(12 - 2x_2)$$

$$x_2 = \frac{8}{10} + \frac{1}{10}x_1 = \frac{1}{5}\left(4 + \frac{1}{2}x_1\right) = 0.2(4 + 0.5x_1)$$

$$x_{10} = 0$$

$$x_{20} = 0$$

Iteración I

$$x_{11} = 0.2(12 - 2(0)) = 2.4$$

$$x_{21} = 0.2(4 + 0.5(2.4)) = 1.04$$

Iteración II

$$x_{12} = 0.2(12 - 2(1.04)) = 1.984$$

$$x_{22} = 0.2(4 + 0.5(1.984)) = 0.998$$

Iteración III

$$x_{13} = 0.2(12 - 2(0.998)) = 2.0006$$

$$x_{23} = 0.2(4 + 0.5(2.0006)) = 1.00006$$

Iteración IV

$$x_{14} = 0.2(12 - 2(1.00006)) = 1.999$$

$$x_{24} = 0.2(4 + 0.5(1.999)) = 0.999$$



Nombre: Ramírez Villarreal Axel

Día Mes

Tema:

$$\textcircled{3} \begin{cases} 8x_1 + x_2 = 4 \\ 2x_1 + 5x_2 = 3 \\ x_1 + 4x_3 = 3 \end{cases}$$

$$x_1 = \frac{4}{8} - \frac{1}{8}x_2 = \frac{1}{2} - \frac{1}{8}x_2 = \frac{1}{2}\left(1 - \frac{1}{4}x_2\right) = 0.5(1 - 0.25x_2)$$

$$x_2 = \frac{3}{5} - \frac{2}{5}x_1 = \frac{1}{5}(3 - 2x_1) = 0.2(3 - 2x_1)$$

$$x_3 = \frac{3}{4} - \frac{1}{4}x_1 = \frac{1}{4}(3 - x_1) = 0.25(3 - x_1)$$

Iteración I

$$x_{11} = 0.5(1 - 0.25(0)) = 0.5$$

$$x_{21} = 0.2(3 - 2(0.5)) = 0.4$$

$$x_{31} = 0.25(3 - (0.5)) = 0.625$$

Iteración II

$$x_{12} = 0.5(1 - 0.25(0.4)) = 0.45$$

$$x_{22} = 0.2(3 - 2(0.45)) = 0.42$$

$$x_{32} = 0.25(3 - (0.45)) = 0.637$$

Iteración III

$$x_{13} = 0.5(1 - 0.25(0.42)) = 0.4475$$

$$x_{23} = 0.2(3 - 2(0.447)) = 0.421$$

$$x_{33} = 0.25(3 - (0.45)) = 0.638$$

Iteración IV

$$x_{14} = 0.5(1 - 0.25(0.421)) = 0.447$$

$$x_{24} = 0.2(3 - 2(0.447)) = 0.42105$$

$$x_{34} = 0.25(3 - (0.447)) = 0.638$$

Nombre: Ramírez Villarreal Axel

Día Mes Año

F

Tema:

$$\begin{aligned} 6x_1 + 2x_2 + x_3 &= 22 \\ -x_1 + 8x_2 + 2x_3 &= 20 \\ x_1 - x_2 + 6x_3 &= 23 \end{aligned}$$

$$x_1 = \frac{22}{6} - \frac{2}{6}x_2 - \frac{1}{6}x_3 = \frac{11}{3} - \frac{1}{3}x_2 - \frac{1}{6}x_3 = \frac{1}{3}(11 - x_2 - \frac{1}{2}x_3)$$

$$= 0.333(11 - x_2 - 0.5x_3)$$

$$x_2 = \frac{20}{8} + \frac{1}{8}x_1 - \frac{2}{8}x_3 = \frac{5}{2} + \frac{1}{8}x_1 - \frac{1}{4}x_3$$

$$= \frac{1}{2}(5 + \frac{1}{4}x_1 - \frac{1}{2}x_3) = 0.5(5 + 0.25x_1 - 0.5x_3)$$

$$x_3 = \frac{23}{6} - \frac{1}{6}x_1 + \frac{1}{6}x_2 = \frac{1}{6}(23 - x_1 + x_2) = 0.16(23 - x_1 + x_2)$$

Iteración I

$$\begin{aligned} x_{11} &= 0.333(11 - 0 - 0.5(0)) = 3.665 \\ x_{21} &= 0.5(5 + 0.25(3.665) - 0.5(0)) = 2.958 \\ x_{31} &= 0.166(23 - 3.665 + 2.958) = 3.715 \end{aligned}$$

Iteración II

$$\begin{aligned} x_{12} &= 0.333(11 - (2.958) - 0.5(3.715)) = 2.061 \\ x_{22} &= 0.5(5 + 0.25(2.061) - 0.5(3.715)) = 1.878 \\ x_{32} &= 0.166(23 - (2.061) + (1.878)) = 3.794 \end{aligned}$$

Iteración III

$$\begin{aligned} x_{13} &= 0.333(11 - (1.878) - 0.5(3.794)) = 2.425 \\ x_{23} &= 0.5(5 + 0.25(2.425) - 0.5(3.794)) = 1.868 \\ x_{33} &= 0.166(23 - (2.425) + (1.868)) = 3.738 \end{aligned}$$

Iteración IV

$$\begin{aligned} x_{14} &= 0.333(11 - (1.868) - 0.5(3.738)) = 2.425 \\ x_{24} &= 0.5(5 + 0.25(2.425) - 0.5(3.738)) = 1.868 \\ x_{34} &= 0.166(23 - (2.425) + (1.868)) = 3.7405 \end{aligned}$$



## Jacobi

Nombre: Ramírez Villarreal Axel

Día

Mes

Año

Tema:

Jacobi

$$\begin{cases} 9x + 2y - z = -2 \\ 7x + 8y + 5z = 3 \\ 3x + 4y - 10z = 6 \end{cases}$$

$$x = -\frac{2}{9} - \frac{2}{9}y + \frac{1}{9}z = -0.222 - 0.222y + 0.111z$$

$$y = \frac{3}{8} - \frac{7}{8}x - \frac{5}{8}z = 0.375 - 0.875x - 0.625z$$

$$z = \frac{3}{5} + \frac{3}{10}x + \frac{2}{5}y = -0.6 + 0.3x + 0.4y$$

Iteración I

$$\begin{aligned} x_1 &= -0.222 - 0.222(0) + 0.111(0) = -0.222 \\ y_1 &= 0.375 - 0.875(0) - 0.625(0) = 0.375 \\ z_1 &= -0.6 + 0.3(0) + 0.4(0) = -0.6 \end{aligned}$$

Iteración II

$$\begin{aligned} x_2 &= -0.222 - 0.222(0.375) + 0.111(-0.6) = -0.372 \\ y_2 &= 0.375 - 0.875(-0.372) - 0.625(-0.6) = 0.944 \\ z_2 &= -0.6 + 0.3(-0.372) + 0.4(0.375) = -0.516 \end{aligned}$$

Iteración III

$$\begin{aligned} x_3 &= -0.222 - 0.222(0.944) + 0.111(-0.516) = -0.489 \\ y_3 &= 0.375 - 0.875(-0.372) - 0.625(-0.516) = 1.023 \\ z_3 &= -0.6 + 0.3(-0.372) + 0.4(0.944) = -0.333 \end{aligned}$$

Iteración IV

$$\begin{aligned} x_4 &= -0.222 - 0.222(1.023) + 0.111(-0.333) = -0.486 \\ y_4 &= 0.375 - 0.875(-0.489) - 0.625(-0.333) = 1.011 \\ z_4 &= -0.6 + 0.3(-0.489) + 0.4(1.023) = -0.337 \end{aligned}$$

$$\textcircled{2} \quad \begin{aligned} 5x_1 + 2x_2 &= 12 \\ -x_1 + 10x_2 &= 8 \end{aligned}$$

$$x_1 = \frac{12}{5} - \frac{2}{5}x_2 = \frac{12}{5} - \frac{2}{5}x_2 = 2.4 - 0.4x_2$$

$$x_2 = \frac{8}{10} + \frac{1}{10}x_1 = \frac{4}{5} + \frac{1}{10}x_1 = 0.8 + 0.1x_1$$

Iteración I

$$x_{11} = 2.4 - 0.4(0) = 2.4$$

$$x_{21} = 0.8 + 0.1(0) = 0.8$$

Iteración II

$$x_{12} = 2.4 - 0.4(0.8) = 2.08$$

$$x_{22} = 0.8 + 0.1(2.4) = 1.04$$

Iteración III

$$x_{13} = 2.4 - 0.4(1.04) = 1.984$$

$$x_{23} = 0.8 + 0.1(1.984) = 1.008$$

Iteración IV

$$x_{14} = 2.4 - 0.4(1.008) = 1.9968$$

$$x_{24} = 0.8 + 0.1(1.9968) = 1.00968$$

$\textcircled{3}$

$$\begin{aligned} 8x_1 + x_2 &= 4 \\ 2x_1 + 5x_2 &= 3 \\ x_1 + 4x_3 &= 3 \end{aligned}$$

$$x_1 = \frac{4}{8} - \frac{1}{8}x_2 = \frac{1}{2} - \frac{1}{8}x_2 =$$

$$x_2 = \frac{3}{5} - \frac{2}{5}x_1 = 0.6 - 0.4x_1$$

$$x_3 = \frac{3}{4} - \frac{1}{4}x_1 = 0.75 - 0.125x_1$$

Iteración I

$$x_{11} = 0.5 - 0.125(0) = 0.5$$

$$x_{21} = 0.6 - 0.4(0) = 0.6$$

$$x_{31} = 0.75 - 0.125(0) = 0.75$$

Iteración II

$$x_{12} = 0.5 - 0.125(0.6) = 0.425$$

$$x_{22} = 0.6 - 0.4(0.5) = 0.4$$

$$x_{32} = 0.75 - 0.125(0.5) = 0.625$$

Iteración III

$$x_{13} = 0.5 - 0.125(0.4) = 0.45$$

$$x_{23} = 0.6 - 0.4(0.425) = 0.425$$

$$x_{33} = 0.75 - 0.125(0.425) = 0.625$$

Iteración IV

$$x_{14} = 0.5 - 0.125(0.425) = 0.4375$$

$$x_{24} = 0.6 - 0.4(0.4375) = 0.425$$

$$x_{34} = 0.75 - 0.125(0.4375) = 0.625$$



$$\begin{aligned} 6x_1 + 2x_2 + x_3 &= 22 \\ -x_1 + 8x_2 + 2x_3 &= 20 \\ x_1 - x_2 + 6x_3 &= 23 \end{aligned}$$

$$x_1 = \frac{11}{3} - \frac{1}{3}x_2 - \frac{1}{6}x_3 = \frac{1}{3}(11 - x_2 - \frac{1}{2}x_3) = 0.33(11 - x_2 - 0.5x_3)$$

$$x_2 = \frac{5}{2} + \frac{1}{8}x_1 - \frac{1}{4}x_3 = \frac{1}{2}(5 + \frac{1}{4}x_1 - \frac{1}{2}x_3) = 0.5(5 + 0.25x_1 - 0.5x_3)$$

$$x_3 = \frac{23}{6} - \frac{1}{6}x_1 + \frac{1}{6}x_2 = \frac{1}{6}(23 - x_1 + x_2) = 0.16(23 - x_1 + x_2)$$

Iteración I

$$x_{11} = 0.333(11 - 0 - 0.5(0)) = 3.666$$

$$x_{21} = 0.5(5 + 0.25(0) - 0.5(0)) = 2.5$$

$$x_{31} = 0.166(23 - 0 + 0) = 3.833$$

Iteración II

$$x_{12} = 0.33(11 - 2.5 - 0.5(3.833)) = 2.194$$

$$x_{22} = 0.5(5 + 0.25(3.6) - 0.5(3.833)) = 2$$

$$x_{32} = 0.16(23 - (3.666) + 2.5) = 3.638$$

Iteración III

$$x_{13} = 0.333(11 - 2 - 0.5(3.638)) = 2.393$$

$$x_{23} = 0.5(5 + 0.25(2.194) - 0.5(3.638)) = 1.864$$

$$x_{33} = 0.166(23 - (2.194) + 2) = 3.8$$

Iteración 4

$$x_{14} = 0.33(11 - (1.864) - 0.5(3.8)) = 2.411$$

$$x_{24} = 0.5(5 + 0.25(2.393) - 0.5(3.8)) = 1.848$$

$$x_{34} = 0.166(23 - (2.393) + (1.864)) = 3.745$$