

Ecuación 1

Nombre: Ramos Hernández Antonio	Día	Mes	Año	Folio
Tema:				

De los sistemas de ecuaciones, obtener la solución realizando:

- 4 iteraciones completas utilizando Jacobi

①

$$\begin{aligned}x + 2y - z &= -2 \\ 7x + 8y + 5z &= 3 \\ 3x + 4y - 10z &= 6\end{aligned}$$
$$x = -\frac{2}{9} - \frac{2}{9}y + \frac{1}{9}z = -0.2 - 0.2y + 0.1z$$
$$y = \frac{3}{8} - \frac{7}{8}x - \frac{5}{8}z = 0.375 - 0.875x - 0.625z$$
$$z = -\frac{3}{5} + \frac{3}{10}x + \frac{2}{5}y = -0.6 + 0.3x + 0.4y$$
$$\begin{aligned}x_0 &= 0 \\ y_0 &= 0 \\ z_0 &= 0\end{aligned}$$

- Iteración 1

$$\begin{aligned}x_1 &= -0.2 - 0.2(0) + 0.1(0) = -0.2 \\ y_1 &= 0.375 - 0.875(0) - 0.625(0) = 0.375 \\ z_1 &= -0.6 + 0.3(0) + 0.4(0) = -0.6\end{aligned}$$

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• Iteración 2

$$x_2 = -0.2 - 0.2(0.375) + 0.1(-0.6) = -0.372$$

$$y_2 = 0.375 - 0.875(-0.2) - 0.625(-0.6) = 0.94$$

$$z_2 = -0.6 + 0.3(-0.2) + 0.4(0.375) = -0.516$$

• Iteración 3

$$x_3 = -0.2 - 0.2(0.94) + 0.1(-0.516) = -0.48950$$

$$y_3 = 0.375 - 0.875(-0.372) - 0.625(-0.516)$$

$$= 1.02367$$

$$z_3 = -0.6 + 0.3(-0.372) + 0.4(0.94) = -0.3338$$

• Iteración 4

$$x_4 = -0.2 - 0.2(1.02367) + 0.1(0.3338)$$

$$= -0.48679$$

$$y_4 = 0.375 - 0.875(-0.48950) - 0.625(-0.3338)$$

$$= 1.01199$$

$$z_4 = -0.6 + 0.3(-0.48950) + 0.4(1.02367)$$

$$= -0.337407$$

Ecuación 2

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Día: Mes: Año: Folio:

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$$\begin{aligned} 5x_1 + 2x_2 &= 12 \\ -x_1 + 10x_2 &= 8 \end{aligned}$$
$$x_1 = \frac{12}{5} - \frac{2}{5}x_2 = 2.4 - 0.4x_2$$
$$x_2 = \frac{8}{10} + \frac{1}{10}x_1 = 0.8 + 0.1x_1$$
$$x_{10} = 0$$
$$x_{20} = 0$$

• Iteración 1

$$\begin{aligned} x_{11} &= 2.4 - 0.4(0) = 2.4 \\ x_{21} &= 0.8 + 0.1(0) = 0.8 \end{aligned}$$

• Iteración 2

$$\begin{aligned} x_{12} &= 2.4 - 0.4(0.8) = 2.08 \\ x_{22} &= 0.8 + 0.1(2.4) = 1.04 \end{aligned}$$

• Iteración 3

$$\begin{aligned} x_{13} &= 2.4 - 0.4(1.04) = 1.984 \\ x_{23} &= 0.8 + 0.1(2.08) = 1.008 \end{aligned}$$

Iteración 4

$$\begin{aligned} x_{14} &= 2.4 - 0.4(1.008) \\ &= 1.9968 \\ x_{24} &= 0.8 + 0.1(1.984) \\ &= 0.9984 \end{aligned}$$

Ecuación 3

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

$$x_1 = \frac{4}{8} - \frac{1}{8}x_2 = \frac{1}{2} - \frac{1}{8}x_2 = 0.5 - 0.125x_2$$

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

$$x_3 = \frac{3}{4} - \frac{1}{4}x_1 = 0.75 - 0.25x_1$$

$$\begin{aligned} x_{10} &= 0 \\ x_{20} &= 0 \\ x_{30} &= 0 \end{aligned}$$

• Iteración 1

$$\begin{aligned} x_{11} &= 0.5 - 0.125(0) = 0.5 \\ x_{21} &= 0.6 - 0.4(0) = 0.6 \\ x_{31} &= 0.75 - 0.25(0) = 0.75 \end{aligned}$$

• Iteración 2

$$\begin{aligned} x_{12} &= 0.5 - 0.125(0.6) = 0.425 \\ x_{22} &= 0.6 - 0.4(0.5) = 0.4 \\ x_{32} &= 0.75 - 0.25(0.6) = 0.625 \end{aligned}$$

• Iteración 3

$$\begin{aligned} x_{13} &= 0.5 - 0.125(0.4) \\ &= 0.45 \\ x_{23} &= 0.6 - 0.4(0.425) \\ &= 0.43 \\ x_{33} &= 0.75 - 0.25(0.425) \\ &= 0.64375 \end{aligned}$$

• Iteración 4

$$\begin{aligned} x_{14} &= 0.5 - 0.125(0.43) \\ &= 0.44625 \\ x_{24} &= 0.6 - 0.4(0.45) \\ &= 0.42 \\ x_{34} &= 0.75 - 0.25(0.45) \\ &= 0.6375 \end{aligned}$$

Ecuación 4

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$$\begin{aligned}6x_1 + 2x_2 + x_3 &= 22 \\-x_1 + 8x_2 + 2x_3 &= 20 \\x_1 - x_2 + 6x_3 &= 23\end{aligned}$$
$$\begin{aligned}x_1 &= \frac{22}{6} - \frac{2}{6}x_2 - \frac{1}{6}x_3 = \frac{11}{3} - \frac{1}{3}x_2 - \frac{1}{6}x_3 \\&= \frac{1}{3}(11 - x_2 - \frac{1}{2}x_3) = 0.\bar{3}(11 - x_2 - 0.5x_3) \\x_2 &= \frac{20}{8} + \frac{1}{8}x_1 - \frac{2}{8}x_3 = \frac{5}{2} + \frac{1}{8}x_1 - \frac{1}{4}x_3 \\&= \frac{1}{2}(5 + \frac{1}{4}x_1 - \frac{1}{2}x_3) = 0.5(5 + 0.25x_1 - 0.5x_3) \\x_3 &= \frac{23}{6} - \frac{1}{6}x_1 + \frac{1}{6}x_2 = \frac{1}{6}(23 - x_1 + x_2) \\&= 0.\bar{16}(23 - x_1 + x_2)\end{aligned}$$

$x_{10} = 0$
 $x_{20} = 0$
 $x_{30} = 0$

• Iteración 1

$$\begin{aligned}x_{11} &= 0.\bar{3}(11 - (0) - 0.5(0)) = 3.\bar{6} && \frac{11}{3} \\x_{21} &= 0.5(5 + 0.25(0) - 0.5(0)) = 2.5 \\x_{31} &= 0.\bar{16}(23 - (0) + (0)) = 3.\bar{83} && \frac{23}{6}\end{aligned}$$

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• Iteración 2

$$X_{12} = 0.3(11 - (2.5) - 0.5(3.8\bar{3})) = 2.19\bar{4}$$

$$X_{22} = 0.5(5 + 0.25(3.6) - 0.5(3.8\bar{3})) = 2$$

$$X_{32} = 0.16(23 - (3.6) + (2.5)) = 3.63\bar{8}$$

• Iteración 3

$$X_{13} = 0.3(11 - (2) - 0.5(3.63\bar{8})) = 2.39351$$

$$X_{23} = 0.5(5 + 0.25(2.19\bar{4}) - 0.5(3.63\bar{8})) = 1.86458\bar{3}$$

$$X_{33} = 0.16(23 - (2.19\bar{4}) + (2)) = 3.80092$$

• Iteración 4

$$X_{14} = 0.3(11 - (1.86458\bar{3}) - 0.5(3.80092)) = 2.41165$$

$$X_{24} = 0.5(5 + 0.25(2.39351) - 0.5(3.80092)) = 1.84895$$

$$X_{34} = 0.16(23 - (2.39351) + (1.86458\bar{3})) = 3.74517$$