INSTITUTO TECNOLÓGICO DE SONORA

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ASIGNACION06.5_252628 ELIMINACIÓN DE GAUSS

METODOS NUMERICOS COMPUTACIONALES

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15 $2x - y + z = 1$
$-4x + 6y - z = -2$
$-2x + 7y + 2z = 9$

R_1	2	−1	1	1
R_2	−4	6	−1	−2
R_3	−2	7	2	9

$R_2 \rightarrow \frac{4}{2}(R_1)$

$R_3 \rightarrow \frac{2}{2}(R_1)$

R_1	2	−1	1	1
R_2	0	4	1	0
R_3	0	6	3	10

$2(2) = 4 + (-4) = 0$

$2(-1) = -2 + 6 = 4$

$2(1) = 2 + (-1) = 1$

$2(1) = 2 + (-2) = 0$

$1(2) = 2 + (-2) = 0$

$1(-1) = -1 + 7 = 6$

$1(1) = 1 + 2 = 3$

$1(1) = 1 + 9 = 10$

R_1	2	-1	1	1
R_2	0	6	3	10
R_3	0	4	1	0

$R_3 \rightarrow -\frac{4}{6}(R_2)$

2	-1	1	1
0	6	3	10
0	0	-1	-6.667

$-\frac{4}{6}(6) + 4 = 0$

$-\frac{4}{6}(3) + 1 = -1$

$-\frac{4}{6}(10) + 0 = -6.667$

$z = \frac{-6.6667}{-1}$ | $z = 6.6667$

$6y + 3z = 10$
$6y + 3(6.6667) = 10$
$6y + 20.0001 = 10$
$6y = 10 - 20.0001$
$6y = -10.0001$
$y = \frac{-10.0001}{6}$

$y = -1.6666$

$2x - y + z = 1$
$2x - (-1.6666) + 6.6667 = 1$
$2x + 1.6666 + 6.6667 = 1$
$2x + 8.3333 = 1$
$2x = 1 - 8.3333$
$2x = -7.3333$
$x = \frac{-7.3333}{2}$

$x = -3.6666$

$2x - y + z = 1$
$2(-3.6666) - (-1.6666) + 6.6667$
$= 1$
$-7.3332 + 1.6666 + 6.6667$
$1 = 1$

2. $0.0003x + 1.566y = 1.569$

$1.345x + 2.157y = 3.502$

0.0003	1.566	1.569
1.345	2.157	3.502

R_1 / R_2

1.345	2.157	3.502	$R_2 \rightarrow \frac{-0.0003}{1.345}(R_1)$
0.0003	1.566	1.569	

1.345	2.157	3.502
0	1.56552	1.568220

$\frac{-0.0003}{1.345}(1.345) + 0.0003 = 0$

$\frac{-0.0003}{1.345}(2.157) + 1.566 = 1.5655$

$\frac{-0.0003}{1.345}(3.502) + 1.569 = 1.5682$

$$y = \frac{1.568220}{1.565520} \qquad \boxed{y = 1.001725}$$

$1.345x + 2.157y = 3.502$
$1.345x + 2.157(1.001725) = 3.502$
$1.345x + 2.16072 = 3.502$
$1.345x = 3.502 - 2.16072$
$1.345x = 1.34128$

$$x = \frac{1.34128}{1.345} \qquad \boxed{x = 0.997234}$$

$1.345x + 2.157y = 3.502$
$1.345(0.997234) + 2.157(1.001725) = 3.502$
$1.34127973 + 2.160720825 = 3.502$
$3.502 = 3.502$

3. $0x + 2y + z = 4$
$x - y + z = 2$
$2x + y + z = 6$

0	2	1	4
1	-1	1	2
2	1	1	6

2	1	1	6
1	-1	1	2
0	2	1	4

$R_2 \rightarrow -\frac{1}{2}(R_1)$

2	1	1	6
0	-1.5	0.5	-1
0	2	1	4

$-0.5(2) = -1 + 1 = 0$

$-0.5(1) = -0.5$

$-0.5(1) = -0.5 + 1 = 0.5$

$-0.5(6) = -3 + 2 = -1$

2	1	1	6
0	2	1	4
0	-1.5	0.5	-1

$R_3 \to \frac{1.5}{2}(R_2)$

$.75(2) = 1.5 + (-1.5) = 0$

$.75(1) = .75 + .5 = 1.25$

$.75(4) = 3 + (-1) = 2$

2	1	1	6
0	2	1	4
0	0	1.25	2

$z = \frac{2}{1.25}$ $\boxed{z = 1.6}$

$2y + z = 4$
$2y + 1.6 = 4$
$2y = 4 - 1.6$
$2y = 2.4$
$y = \frac{2.4}{2}$

$\boxed{y = 1.2}$

$2x + y + z = 6$
$2x + 1.2 + 1.6 = 6$
$2x + 2.8 = 6$
$2x = 6 - 2.8$
$2x = 3.2$
$x = \frac{3.2}{2}$ $\boxed{x = 1.6}$

$2x + y + z = 6$
$2(1.6) + 1.2 + 1.6 = 6$
$3.2 + 2.8 = 6$
$6 = 6$

4.5 $1x + 2y + 3z = 14$
$2x + 5y + z = 15$
$4x + 2y + 2z = 20$

1	2	3	14
2	5	1	15
4	2	2	20

4	2	2	20
2	5	1	15
1	2	3	14

$R_2 \to -\frac{1}{2}(R_1)$

$R_3 \to -\frac{1}{4}(R_1)$

$-0.5(4) = -2 + 2 = 0$
$-0.5(2) = -1 + 5 = 4$
$-0.5(2) = -1 + 1 = 0$
$-0.5(20) = -10 + 15 = 5$

4	2	2	20
0	4	0	5
0	1.5	2.5	9

$-0.25(4) = -1 + 1 = 0$
$-0.25(2) = -.5 + 2 = 1.5$
$-0.25(2) = -.5 + 3 = 2.5$
$-0.25(20) = -5 + 14 = 9$

4	2	2	20
0	4	0	5
0	0	2.5	7.125

$R_3 \rightarrow -\frac{1.5}{4}(R_2)$

$-\frac{1.5}{4} = -.375$

$-.375(4) = -1.5 + 1.5 = 0$
$-.375(0) = 0 + 2.5 = 2.5$
$-.375(5) = -1.875 + 9 = 7.125$

$\frac{7.125}{2.5} = 2.85$ $\boxed{z = 2.85}$

$4y + 0z = 5$
$4y = 5$
$y = \frac{5}{4}$ $\boxed{y = 1.25}$

$4x + 2y + 2z = 20$
$4x + 2(1.25) + 2(2.85) = 20$
$4x = 20 - 8.2$
$x = \frac{11.8}{4}$ $\boxed{x = 2.95}$

$4x + 2y + 2z = 20$
$4(2.95) + 2(1.25) + 2(2.85) = 20$
$11.8 + 2.5 + 5.7 = 20$
$20 = 20$

So $10x - 7y + 0z = 7$

$-3x + 2.099y + 6z = 3.901$

$5x - 1y + 5z = 6$

10	-7	0	7
-3	2.099	6	3.901
5	-1	5	6

$R_2 \rightarrow \frac{3}{10}(R_1)$

$R_3 \rightarrow -\frac{1}{2}(R_1)$

10	-7	0	7
0	-0.001	6	6.001
0	2.5	5	2.5

$0.3(10) + (-3) = 0$

$0.3(-7) + 2.099 = -0.001$

$0.3(0) + 6 = 6$

$0.3(7) + 3.901 = 6.001$

$-0.5(10) + 5 = 0$

$-0.5(-7) + 1 = 2.5$

$-0.5(0) + 5 = 5$

$-0.5(7) + 6 = 2.5$

10	−7	0	7
0	2.5	5	2.5
0	−0.001	6	6.001

$R_3 \to \frac{0.001}{2.5}(R_2)$

$\frac{0.001}{2.5} = 0.0004$

10	−7	0	7
0	2.5	5	2.5
0	0	6.002	6.002

$0.0004(2.5) + (-0.001) = 0$

$.0004(5) + 6 = 6.002$

$.0004(2.5) + 6.001 = 6.002$

$z = \frac{6.002}{6.002}$ $\boxed{z = 1}$

$2.5y + 5z = 2.5$
$2.5y + 5(1) = 2.5$
$2.5y + 5 = 2.5$
$2.5y = 2.5 - 5$
$2.5y = -2.5$
$y = -\frac{2.5}{2.5}$ $\boxed{y = -1}$

$10x - 7y + 0z = 7$
$10x - 7(-1) + 0(1) = 7$
$10x + 7 = 7$
$10x = 7 - 7$
$10x = 0$ $x = \frac{0}{10}$ $\boxed{x = 0}$

$10x - 7y + 0z = 7$
$10(0) - 7(-1) + 0(1) = 7$
$0 + 7 + 0 = 7$
$\boxed{7 = 7}$

Asignacion06_252628

1.- $3x_1 + 4x_2 + 3x_3 = 10$
$x_1 + 5x_2 - x_3 = 7$
$6x_1 + 3x_2 + 7x_3 = 15$

3	4	3	10
1	5	-1	7
6	3	7	15

6	3	7	15	$R_2 \rightarrow -\frac{1}{6}(R_1)$
1	5	-1	7	$R_3 \rightarrow -\frac{3}{6}(R_1)$
3	4	3	10	

6	3	7	15	$-\frac{1}{6}(6) = -1 + 1 = 0$
0	4.5	-2.1667	4.5	$-\frac{1}{6}(3) - 0.5 + 5 = 4.5$
0	2.5	-0.5	2.5	$-\frac{1}{6}(7) = -1.1667 + -1 = -2.1667$
				$-\frac{1}{6}(15) = -2.5 + 7 = 4.5$

$-0.5(6) = -3 + 3 = 0$
$-0.5(3) = -1.5 + 4 = 2.5$
$-0.5(7) = -3.5 + 3 = -0.5$
$-0.5(15) = -7.5 + 10 = 2.5$

6	3	7	15
0	4.5	-2.1667	4.5
0	0	.7037	0

$R_3 \rightarrow \frac{-2.5}{4.5}(R_2)$

$\frac{-2.5}{4.5}(4.5) = -2.5 + 2.5 = 0$

$\frac{-2.5}{4.5}(-2.1667) = 1.2037 + (-0.5) = 0.7037$

$\frac{-2.5}{4.5}(4.5) = -2.5 + 2.5 = 0$

$x_3 = \frac{0}{.7037}$ $\boxed{x_3 = 0}$

$4.5x_2 - 2.1667x_3 = 4.5$
$4.5x_2 - 2.1667(0) = 4.5$
$4.5x_2 = 4.5$
$x_2 = \frac{4.5}{4.5}$ $\boxed{x_2 = 1}$

$6x_1 + 3x_2 + 7x_3 = 15$
$6x_1 + 3(1) + 7(0) = 15$
$6x_1 + 3 = 15$
$6x_1 = 15 - 3$
$6x_1 = 12$
$x_1 = \frac{12}{6}$ $\boxed{x_1 = 2}$

$3x_1 + 4x_2 + 3x_3 = 10$
$3(2) + 4(1) + 3(0) = 10$
$6 + 4 = 10$
$10 = 10$

$6x_1 + 3x_2 + 7x_3 = 15$
$6(2) + 3(1) + 7(0) = 15$
$12 + 3 = 15$
$15 = 15$