INGENIERIA EN SISTEMAS COMPUTACIONALES

METODOS NUMERICOS

PROFESOR:

PEDRO FERNANDO FLORES PALMEROS

ITERACIONES GAUSS SIEDEL

GRUPO:

5501

ALUMNO:

RUIZ TEODOCIO JOSE PABLO

GAUSS SIDEL

Ruiz Teodocio Jose Pablo

Gauss - Siedel

1) $9x + 2y - z = -2$
$7x + 8y + 5z = 3$
$3x + 4y - 10z = 6$

$x = -0.22 - 0.22y + 0.11z$
$y = 0.375 - 0.875x - 0.625z$
$z = -0.6 + 0.3x + 0.4y$

$x_0 = 0$
$y_0 = 0$
$z_0 = 0$

$x_1 = -0.22 - 0.22(0) + 0.11(0) = -0.22$
$y_1 = 0.375 - 0.875(-.22) - 0.625(0) = 0.56925$
$z_1 = -0.6 + 0.3(-.22) + 0.4(.56926) = -0.4389$

$x_1 = -0.22$
$y_1 = 0.56925$
$z_1 = -0.4389$

$x_2 = -0.22 - 0.22(.56925) + .11(-0.4389) = -0.3971$
$y_2 = 0.375 - .875(-.3971) - .625(-.4389) = 0.9970$
$z_2 = -0.6 + 0.3(-.3971) + 0.4(.9970) = -0.3204$

$x_2 = -0.3971$
$y_2 = 0.9970$
$z_2 = -0.3204$

$x_3 = -.22 - .22(.9970) + .11(-.3204) = -0.4794$
$y_3 = .375 - .875(-.4794) - .625(-.3204) = 0.9947$
$z_3 = -0.6 + 0.3(-.4794) + 0.4(.9947) = -0.3459$

$x_3 = -0.4794$
$y_3 = 0.9947$
$z_3 = -0.3459$

$x_4 = -.22 - .22(.9947) + .11(-.3459) = -0.4812$
$y_4 = .375 - .875(-.4812) - .625(-.3459) = 1.0127$
$z_4 = -0.6 + 0.3(-.4812) + 0.4(1.0127) = -0.3393$

$x_4 = -0.4812$
$y_4 = 1.0127$
$z_4 = -0.3394$

2) $5x + 2y = 12$
$-x + 10y = 8$

$x = 2.4 + 0.4y$
$y = 0.8 + 0.1x$

$x_0 = 0$
$y_0 = 0$

$x_1 = 2.4 + 2(0) = 2.4$
$y_1 = 0.8 + 0.1(2.4) = 1.04$

$x_1 = 2.4$
$y_1 = 1.04$

$x_2 = 2.4 + 2(1.04) = 4.48$
$y_2 = 0.8 + 0.1(4.48) = 1.248$

$x_2 = 4.48$
$y_2 = 1.248$

$x_3 = 2.4 + 2(1.248) = 4.896$
$y_3 = 0.8 + 0.1(4.896) = 1.2896$

$x_3 = 4.896$
$y_3 = 1.2896$

$x_4 = 2.4 + 2(1.2896) = 4.9792$
$y_4 = 0.8 + 0.1(4.9792) = 1.29792$

$x_4 = 4.9792$
$y_4 = 1.29792$

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3) $8x+y=4$ $\quad x=0.5-0.125y$ $\quad x_0=0$

$2x+5y=3$ $\quad y=0.6-0.4x$ $\quad y_0=0$

$x+4z=3$ $\quad z=0.75-0.25x$ $\quad z_0=0$

$x_1=0.5-0.125(0)=0.5$ $\quad x_1=0.5$

$y_1=0.6-0.4(0.5)=0.4$ $\quad y_1=0.4$

$z_1=0.75-0.25(0.5)=0.625$ $\quad z_1=0.625$

$x_2=0.5-0.125(0.4)=0.46$ $\quad x_2=0.45$

$y_2=0.6-0.4(0.45)=0.42$ $\quad y_2=0.42$

$z_2=0.75-0.25(0.45)=0.6375$ $\quad z_2=0.6375$

$x_3=0.5-0.125(0.42)=0.4475$ $\quad x_3=0.4475$

$y_3=0.6-0.4(0.4475)=0.421$ $\quad y_3=0.421$

$z_3=0.75-0.25(0.4475)=0.638125$ $\quad z_3=0.638125$

$x_4=0.5-0.125(0.421)=0.447375$ $\quad x_4=0.447375$

$y_4=0.6-0.4(0.447375)=0.42105$ $\quad y_4=0.42105$

$z_4=0.75-0.25(0.447375)=0.63815625$ $\quad z_4=0.63815625$

4) $6x+2y+z=22$ $\quad x=3.6-0.3y-0.1z$ $\quad x_0=0$

$-x+8y+2z=20$ $\quad y=2.5+0.125x-0.25z$ $\quad y_0=0$

$x-y+6z=23$ $\quad z=3.83-0.16x+0.1y$ $\quad z_0=0$

$x_1=3.6-0.3(0)-0.1(0)=3.6$ $\quad x_1=3.6$

$y_1=2.5+0.125(3.6)-0.25(0)=2.95$ $\quad y_1=2.95$

$z_1=3.83-0.16(3.6)-0.16(2.95)=2.782$ $\quad z_1=2.782$

$x_2=3.6-0.3(2.95)-0.16(2.782)=2.26988$ $\quad x_2=2.26988$

$y_2=2.5+0.125(2.26988)-0.25(2.782)=2.088235$ $\quad y_2=2.088235$

$z_2=3.83-0.16(2.26988)+0.16(2.088235)=3.8009368$ $\quad z_1=3.8009368$

$x_3=3.6-0.3(2.088235)-0.16(3.8009368)=2.365379612$ $\quad x_3=2.365379612$

$y_3=2.5+0.125(2.365379612)-0.25(3.8009368)=1.846438261$ $\quad y_3=1.846438261$

$z_3=3.83-0.16(2.365379612)+0.16(1.846438261)=3.746809038232$ $\quad z_3=3.746809038232$

$x_4=3.6-0.3(1.846438261)-0.16(3.746809038232)=2.446879023378$

$y_4=2.5+.125(2.446879023378)-0.25(3.746809038232)=1.864157632342$

$z_4=3.83-0.16(2.446879023378)+0.16(1.864157632342)=3.737646277687$