

# Jacobi

```

3      %      x(1)  + 2 * x(2)   - 2;
4      %      x(1)^2 + 4 * x(2)^2 - 4
5      %      ];
6
7      %J= @(x) [
8      %          1,          2;
9      %          2*x(1), 8 * x(2)
10     %      ];
11     %%x = [1; 1];
12
13     F= @(x) [ x(1)^2  + x(2)^2 - 10;
14              x(1)  -   x(2)];
15     J= @(x) [ 2*x(1), 2*x(2);
16              1,   -1 ];
17     x = [1; 1];
18     error = 1e3;
19     tol = 1e-5;
20     n = 0;
21
22     while error > tol
23         dx = -J(x)\F(x);
24         error = norm(dx)/norm(x);
25         x = x + dx;
26         n = n+1;
27     end
28     fprintf("Iteraciones : %d \n",n);
29
30     fprintf("Respuesta : %f \n", x. ');
31
32     F(x)

```

Iteraciones : 5  
Respuesta : 2.236068  
Respuesta : 2.236068  
ans = 2x1  
10<sup>11</sup> x  
0.1686

[illegible]

## Gauss

```
%s.m x matriztrisup.m x diagonalprincipal.m x caltraza.m x MatTriInf.m x MatDiagonal.m x Matidentidad.m x cramer2x2.m x untitled *.x x untitled2.mlx x x
1 gauss - seidel
2 %% Gauss Seidel Method
3 %% Solution of x in Ax=b using Gauss Seidel Method
4 % * Initialize 'A' 'b' & intial guess 'x'
5 %%
6
7 % A=[5 -2 3 0;-3 9 1 -2;2 -1 -7 1; 4 3 -5 7]
8 % b=[-1 2 3 0.5]'
9 % x=[0 0 0]'
```

```
10
11 A=[17 -2 -3;
12 % -5 21 -2;
13 % -5 -5 22]
14 % b=[500 200 30]'
15 % x=[0 0 0]'
```

```
16
17 % A= input('A = ');
18 % b= input('b = ');
19 % x= input('x = ');
20
21 n=size(x,1);
22 normVal=Inf;
23 %%
24 % * Tolerance for method
25 tol==1e-5; itr==0;
26 %% Algorithm: Gauss Seidel Method
27 %%
28 while normVal>tol
29     x_old=x;
```

R39	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1																			
2		Sistema a solucionar																	
3		8	x	-4	y		-3	z	=	14									
4		2	x	-5	y		3	z	=	-1	No. x	y	z	err x		err y		err z	
5		-3	x	1	y		9	z	=	9	0	0	0	0	x				
6											1	1.75	0.9	1.483333333					
7											2	2.75625	2.1925	1.675138889	0.365079365	0.589509692	0.114501285		
8											3	3.474427083	2.594854167	1.869825231	0.206703743	0.155058489	0.104120075		
9											4	3.748611545	2.821339757	1.936054986	0.073142938	0.080275901	0.034208613		
10		Fila 1		Valor inicial						8	5	3.886690498	2.16309191	1.971529145	0.035526099	0.032564940	0.017993220		
11		Fila 2		Valor inicial						5	6	3.947478025	2.961908697	1.986725042	0.015399079	0.015395311	0.007648717		
12		Fila 3		Valor inicial						9	7	3.975976239	2.982425521	1.99399448	0.007167602	0.006879241	0.003620841		
13											8	3.98894206	2.991943704	1.997209164	0.003250441	0.003181271	0.001634463		
14		Fila 1		suma valores restantes						7	9	3.994925288	2.996295614	1.998720028	0.001497707	0.001452430	0.000755916		
15		Fila 2		suma valores restantes						5	10	3.997667817	2.998299144	1.99941159	0.000686032	0.000668222	0.000345883		
16		Fila 3		suma valores restantes						4	11	3.998928918	2.999218521	1.999729804	0.000315360	0.000306539	0.000159128		
17											12	3.999507937	2.999641057	1.999875862	0.000144773	0.000140682	0.000079303		
18											13	3.999773977	2.999835108	1.99994298	0.000066514	0.000064687	0.000033560		
19		Situacion									14	3.999896171	2.999924257	1.999973806	0.000030549	0.000029717	0.000015413		
20				DOMINANTE							15	3.999952306	2.999965206	1.999987968	0.000014034	0.000013650	0.000007081		
21											16	3.999978091	2.999984017	1.999994473	0.000006446	0.000006270	0.000003252		
22											17	3.999989936	2.999992658	1.999997461	0.000002961	0.000002880	0.000001494		
23											18	3.999995377	2.999996627	1.999998834	0.000001360	0.000001323	0.000000686		
24											19	3.999997876	2.999998451	1.999999464	0.000000625	0.000000608	0.000000315		
25											20	3.999999024	2.999999288	1.999999754	0.000000287	0.000000279	0.000000145		
26											21	3.999999552	2.999999673	1.999999887	0.000000132	0.000000128	0.000000067		
27											22	3.999999794	2.999999985	1.999999948	0.000000061	0.000000059	0.000000031		
28			x		y										z				
29		C/ 8	3.999999794		-4	2.999999985									-3	1.999999948	=	13.999999911	
30		C/ 2	3.999999794		-5	2.999999985									3	1.999999948	=	-0.9999998166	
31		C/ -3	3.999999794		1	2.999999985									9	1.999999948	=		9
32																			

## Newton Raphson

```
p.m x diagonal principal.m x caltraza.m x MatTriInf.m x MatDiagonal.m x MatIdentidad.m x cramer2x2.m x untitled * x untitled.mlx x untitled2.mlx x untitled3.mlx x
```

```
1 %newton raphson 3 x 3
2 clc
3
4 F= @(x) [
5     x(1)^3 + x(2)^3 - x(3)^3 - 129;
6     x(1)^2 + x(2)^2 - x(3)^2 - 9.75;
7     x(1) + x(2) - x(3) - 9.49;
8 ];
9
10 J= @(x) [
11     3*x(1)^2, 3*x(2)^2, -3*x(3)^2;
12     2*x(1), 2*x(2), -2*x(3);
13     1, 1, -1;
14 ];
15
16 x = [4; 2; -3];
17
18 error = 1e3;
19 tol = 1e-5;
20 n = 0;
21
22 while error > tol
23     dx = -J(x)\F(x);
24     error = norm(dx)/norm(x);
25     x = x + dx;
26     n = n+1;
27
28 end
29 fprintf("Iteraciones : %d \n",n);
30
31 fprintf("Respuesta : %f \n", x,:);
```

```
Iteraciones : 4
Respuesta : 4.357338
Respuesta : 1.666565
```

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1					J ( Jacobiana )	derivadas parciales										
2	$x + 2y - 2 = 0$	f1														
3	$x^2 + 4y^2 - 4 = 0$	f2			$2x$	$8y$										
4																
5																
6																
7				iter	x	y		f1	f2		h1	h2				
8				1	1.00000000	1.00000000		1.00000000	1.00000000		-1.50000000	0.25000000				
9				2	-0.50000000	1.25000000		0.00000000	2.50000000		0.41666667	-0.20833333				
10				3	-0.08333333	1.04166667		0.00000000	0.34722222		0.08012821	-0.04006410				
11				4	-0.00320513	1.00160256		0.00000000	0.01284106		0.00320001	-0.00160000				
12				5	-0.00000512	1.00000256		0.00000000	0.00002048		0.00000512	-0.00000256			2	-0.5
13				6	0.00000000	1.00000000		0.00000000	0.00000000						-0.5	0.25
14																
15						Matriz Jacobiana J		f * -1	Delta (H1 y H2)		matriz inversa		Identidad			
16				iter	1 x	1	1.00000000	2.00000000	-1.00000000	-1.50000000	2.00000000	-0.50000000	1.00000000	0.00000000		
17					y	1	2.00000000	8.00000000	-1.00000000	0.25000000	-0.50000000	0.25000000	0.00000000	1.00000000		
18																
19				iter	2 x	-0.5	1.00000000	2.00000000	0.00000000	0.41666667	0.83333333	-0.16666667	1.00000000	0.00000000		
20					y	1.25	-1.00000000	10.00000000	-2.50000000	-0.20833333	0.08333333	0.08333333	0.00000000	1.00000000		
21																
22																
23																
24				iter	3 x	-0.08333333	1.00000000	2.00000000	0.00000000	0.08012821	0.96153846	-0.23076923	1.00000000	0.00000000		
25					y	1.04166667	-0.16666667	8.33333333	-0.34722222	-0.04006410	0.01923077	0.11538462	0.00000000	1.00000000		
26																
27					X											
28				4 x	-0.0032051282	1.00000000	2.00000000	0.00000000	0.00320001	0.99840256	-0.24920128	1.00000000	0.00000000			
29					y	1.001602564	-0.00641026	8.01282051	-0.01284106	-0.00160000	0.00079872	0.12460064	0.00000000	1.00000000		
30																
31					X											
32				5 x	-0.00000512	1.00000000	2.00000000	0.00000000	0.00000512	0.99999744	-0.24999872	1.00000000	0.00000000			
33					y	1.00000256	-0.00001024	8.00002048	-0.00002048	-0.00000256	0.00000128	0.12499936	0.00000000	1.00000000		
34																
35																
36						1.00000000	2.00000000			2 -						
37						2.00000000	8.00000000			-0.5 C						
38																