Assignment 10
CS374

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Contents

1 Initial values $x_1^{(0)} = x_2^{(0)} = x_3^{(0)} = 0$

	x1	x2	x3
0	0	0	0
1	1.11111	1.9	0
2	0.9	1.67778	-0.993939
3	1.03513	2.01818	-0.855556
4	0.98193	1.94964	-1.01619
5	1.00739	2.00847	-0.97676
6	0.996476	1.99155	-1.0051
7	1.00151	2.00223	-0.995966
8	0.999304	1.99849	-1.00122
9	1.0003	2.00051	-0.99926
10	0.999862	1.99972	-1.00027
11	1.00006	2.00011	-0.999859
12	0.999972	1.99995	-1.00006
13	1.00001	2.00002	-0.999973
14	0.999994	1.99999	-1.00001
15	1	2	-0.999995
16	0.999999	2	-1
17	1	2	-0.999999
18	1	2	-1

Convergence to root by Jacobi iteration method

	x1	x2	x3
0	0	0	0
1	1.11111	1.67778	-0.913131
2	1.02615	1.96871	-0.995753
3	1.003	1.99813	-1.00014
4	1.00022	2	-1.00006
5	1.00001	2.00002	-1.00001
6	0.999999	2	-1
7	1	2	-1
8	1	2	-1

Convergence to root by Gauss-Seidel method

1. Jacobi Iteration method - 18 iterations
2. Gauss-Seidel method - 8 iterations

2 Initial values $x_1^{(0)} = -100, x_2^{(0)} = 100, x_3^{(0)} = 150$

	x1	x2	x3
0	-100	100	150
1	-26.6667	-23.1	-9.09091
2	4.68788	9.96061	15.6727
3	-1.73704	-3.73939	-4.90055
4	2.0711	3.71757	1.83352
5	0.494323	0.935724	-1.91669
6	1.22011	2.37614	-0.475079
7	0.899882	1.7985	-1.19681
8	1.04426	2.07907	-0.899423
9	0.98004	1.96098	-1.04082
10	1.00887	2.01624	-0.980366
11	0.996014	1.99234	-1.00832
12	1.00178	2.00329	-0.996126
13	0.999203	1.99848	-1.00168
14	1.00036	2.00066	-0.999231
15	0.999841	1.9997	-1.00034
16	1.00007	2.00013	-0.999847
17	0.999968	1.99994	-1.00007
18	1.00001	2.00003	-0.999969
19	0.999994	1.99999	-1.00001
20	1	2.00001	-0.999994
21	0.999999	2	-1
22	1	2	-0.999999
23	1	2	-1

Convergence to root by Jacobi iteration method

	x1	x2	x3
0	-100	100	150
1	-26.6667	-37.7667	21.0061
2	2.9734	-4.9965	1.00598
3	1.5545	1.28731	-0.892066
4	1.0672	1.95418	-1.00166
5	1.00528	1.99944	-1.00124
6	1.0002	2.00033	-1.00017
7	0.999983	2.00006	-1.00002
8	0.999996	2.00001	-1
9	0.999999	2	-1
10	1	2	-1
11	1	2	-1

Convergence to root by Gauss-Seidel method

1. Jacobi Iteration method - 23 iterations
2. Gauss-Seidel method - 11 iterations

3 Initial values $x_1^{(0)} = -1000, x_2^{(0)} = 1000, x_3^{(0)} = 1500$

	x1	x2	x3
0	-1000	1000	1500
1	-276.667	-248.1	-90.9091
2	38.7788	84.5061	165.673
3	-26.6865	-55.5576	-41.3055
4	11.8737	19.629	27.4809
5	-4.12332	-8.71901	-10.3761
6	3.23279	5.83749	4.29509
7	-0.0147306	-0.035084	-3.00439
8	1.44883	2.80426	0.0167753
9	0.797662	1.6052	-1.41487
10	1.08996	2.16493	-0.801254
11	0.959592	1.92238	-1.08451
12	1.01801	2.03343	-0.960755
13	0.991925	1.98462	-1.01707
14	1.00361	2.00674	-0.992206
15	0.998386	1.99694	-1.00343
16	1.00072	2.00135	-0.998447
17	0.999677	1.99939	-1.00069
18	1.00014	2.00027	-0.99969
19	0.999935	1.99988	-1.00014
20	1.00003	2.00005	-0.999938
21	0.999987	1.99998	-1.00003
22	1.00001	2.00001	-0.999988
23	0.999997	2	-1.00001
24	1	2	-0.999998
25	0.999999	2	-1
26	1	2	-1

Convergence to root by Jacobi iteration method

	x1	x2	x3
0	-1000	1000	1500
1	-276.667	-392.767	218.279
2	20.4987	-67.6834	19.0216
3	6.51798	-5.11007	0.0805786
4	1.66994	1.54184	-1.01611
5	1.0527	1.99429	-1.0123
6	1.002	2.00329	-1.00174
7	0.999828	2.00056	-1.00016
8	0.999955	2.00006	-1.00001
9	0.999995	2	-1
10	1	2	-1
11	1	2	-1
12	1	2	-1

Convergence to root by Gauss-Seidel method

1. Jacobi Iteration method - 26 iterations
2. Gauss-Seidel method - 12 iterations