

Eliton Machado da Silva

3)

Método da eliminação de Gauss

Algoritmo

Questão 1:

Operações:

$$L1 = L1 - 0.5 * L0$$

$$L2 = L2 - 0.25 * L0$$

$$L2 = L2 - 0.3888888888888889 * L1$$

$$\text{Solução} = [1.0, -1.0, 3.0]$$

Questão 2:

Operações:

$$L1 = L1 - 0.6666666666666666 * L0$$

$$L2 = L2 - 0.3333333333333333 * L0$$

$$L2 = L2 - 0.4117647058823529 * L1$$

$$\text{Solução} = [1.0, -0.9999999999999999, 0.9999999999999998]$$

Questão 3:

Operações:

$$L1 = L1 + 0.0 * L0$$

$$L2 = L2 + 4.0 * L0$$

$$L2 = L2 + 4.5 * L1$$

$$\text{Solução} = [0.9411764705882355, 1.2352941176470589, -0.5294117647058824]$$

Questão 4:

Operações:

$$L1 = L1 - 0.3333333333333333 * L0$$

$$L2 = L2 - 0.3333333333333333 * L0$$

$$L2 = L2 - 0.7692307692307693 * L1$$

$$\text{Solução} = [1.0, -1.0, -0.9999999999999998]$$

Método iterativo de Jacobi

Algoritmo

Questão 1:

Método de jacobi com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	1.5	0.6	2.75
2	0.6625	-1.1	2.075
3	1.25625	-0.4950000000000001	3.134375
4	0.84015625	-1.15625	2.6834375
5	1.118203125	-0.8094375000000001	3.1180859375
6	0.922837890625	-1.094515625	2.87516796875
7	1.0548369140625	-0.91920234375	3.06654833984375
8	0.9631635009765624	-1.0485541015625	2.945891943359375
9	1.0256655395507812	-0.963622177734375	3.033486175537109
10	0.9825340005493164	-1.023660686035156	2.975394703979492

Questão 2:

Método de jacobi com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	0.6666666666666666	-0.42857142857142855	0.6
2	0.7523809523809524	-0.7904761904761904	0.7238095238095238
3	0.9523809523809524	-0.8503401360544218	0.9238095238095237
4	0.92562358276644	-0.964625850340136	0.9197278911564626
5	1.0031746031746032	-0.955814706835115	0.9936507936507937

itr	x	y	z
6	0.9726595400064788	-0.999092970521542	0.9728539034661484
7	1.008444012525645	-0.9844324124207506	1.0049238743116296
8	0.9879803168432906	-1.0038193962392212	0.9889706449473212
9	1.0062227158437071	-0.9934145605116035	1.0046955743748747
10	0.9940445155494441	-1.0031195114910234	0.9948041931382207

Questão 3:

Método de jacobi com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	5.0	1.5	2.0
2	8.0	2.5	-16.5
3	-49.5	-6.75	-27.5
4	-64.0	-12.25	193.25
5	609.25	98.125	245.75
6	546.0	124.375	-2336.875
7	-7254.375	-1166.9375	-2057.625
8	-3834.0	-1027.3125	27852.5625
9	85617.3125	13927.78125	14310.6875
10	15081.5	7156.84375	-328539.46875

Questão 4:

Método de jacobi com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	0.3333333333333333	-0.75	-0.2

itr	x	y	z
2	0.65	-0.7666666666666667	-0.7166666666666667
3	0.8277777777777778	-0.9458333333333333	-0.79
4	0.9119444444444444	-0.9380555555555555	-0.9330555555555555
5	0.957037037037037	-0.9885416666666667	-0.9452222222222222
6	0.9779212962962962	-0.9833518518518518	-0.9845324074074074
7	0.9892947530864197	-0.9977858796296297	-0.9855953703703703
8	0.9944604166666666	-0.9954739969135802	-0.9965304783950618
9	0.9973348251028806	-0.9996501350308642	-0.9961764814814813
10	0.9986088721707818	-0.9987545344650205	-0.9992570460390947

Método iterativo de Gauss-Seidel

Algoritmo

Questão 1:

Método de Seidel com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	1.5	0.0	2.375
2	0.90625	-0.7125	2.8796875
3	0.9582031249999999	-0.93515625	2.97802734375
4	0.9892822265625	-0.986923828125	2.996141357421875
5	0.9976956176757813	-0.9975347900390625	2.999343490600586
6	0.9995478248596191	-0.999556526184082	2.999891306877136
7	0.9999163048267365	-0.999923044681549	2.9999824461340903
8	0.9999851496368647	-0.999987038308382	2.999997231744975
9	0.9999974516408519	-0.9999978733543307	2.9999995737669525

itr	x	y	z
10	0.9999995748968445	-0.9999996594655188	2.9999999360085483

Questão 2:

Método de Seidel com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	0.6666666666666666	-0.619047619047619	0.838095238095238
2	0.7999999999999999	-0.8965986394557823	0.9779591836734693
3	0.9384126984126985	-0.9761062520246194	0.997981211532232
4	0.9847437641723357	-0.9950642787727336	1.0000898144291732
5	0.9966795810387646	-0.9990769701336966	1.0001102658724652
6	0.9993478914649759	-0.9998451878106974	1.0000375343934234
7	0.9998842804093239	-0.9999776613722134	1.0000097407414632
8	0.9999818606676545	-0.9999976004026051	1.000002188108032
9	0.9999976708990594	-0.9999999597163118	1.0000004416499753
10	0.9999998259275494	-1.0000000764507213	1.000000080684923

Questão 3:

Método de Seidel com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	5.0	1.5	-16.5
2	-47.5	-6.75	185.25
3	574.25	94.125	-2200.875
4	-6785.875	-1098.9375	26046.5625
5	80342.5625	13024.78125	-308343.46875

itr	x	y	z
6	-951074.96875	-154170.234375	3650131.640625
7	11258740.390625	1825067.3203125	-43209892.2421875
8	-133279806.3671875	-21604944.62109375	511514282.84765625
9	1577752742.7851562	255757142.92382812	-6055253826.216797
10	-18677275759.498047	-3027626911.6083984	71681476128.38379

Questão 4:

Método de Seidel com chute inicial = [0, 0, 0]

itr	x	y	z
0	0	0	0
1	0.3333333333333333	-0.6666666666666666	-0.6666666666666667
2	0.7777777777777778	-0.8888888888888889	-0.8888888888888889
3	0.9259259259259259	-0.962962962962963	-0.962962962962963
4	0.9753086419753086	-0.9876543209876544	-0.9876543209876545
5	0.991769547325103	-0.9958847736625515	-0.9958847736625515
6	0.9972565157750344	-0.9986282578875172	-0.9986282578875173
7	0.9990855052583448	-0.9995427526291725	-0.9995427526291725
8	0.9996951684194483	-0.9998475842097242	-0.9998475842097243
9	0.9998983894731496	-0.9999491947365747	-0.9999491947365747
10	0.9999661298243833	-0.9999830649121916	-0.9999830649121917