

$\underline{Ax} = \underline{b}$ ITERATIONS,

applied to

$$\begin{aligned}
 2x_1 - x_2 &= 0 \\
 -x_1 + 2x_2 - x_3 &= 0 \\
 -x_2 + 2x_3 - x_4 &= 2 \\
 -x_3 + 2x_4 - x_5 &= 0 \\
 -x_4 + 2x_5 &= 0
 \end{aligned}$$

1. Jacobi

n	x_1	x_2	x_3	x_4	x_5	RMS
0	0.000	0.000	0.000	0.000	0.000	1.9494
1	0.000	0.000	1.000	0.000	0.000	1.6733
2	0.000	0.500	1.000	0.500	0.000	1.4491
3	0.250	0.500	1.500	0.500	0.250	1.2550
4	0.250	0.875	1.500	0.875	0.250	1.0869
5	0.438	0.875	1.875	0.875	0.438	0.9412
6	0.438	1.156	1.875	1.156	0.438	0.8151
7	0.578	1.156	2.156	1.156	0.578	0.7059
8	0.578	1.367	2.156	1.367	0.578	0.6114
9	0.684	1.367	2.367	1.367	0.684	0.5294
10	0.684	1.525	2.367	1.525	0.684	0.4585

2. Gauss-Seidel

0	0.000	0.000	0.000	0.000	0.000	1.9494
1	0.000	0.000	1.000	0.500	0.250	1.5370
2	0.000	0.500	1.500	0.875	0.438	1.1901
3	0.250	0.875	1.875	1.156	0.578	0.8926
4	0.438	1.156	2.156	1.367	0.684	0.6694
5	0.578	1.367	2.367	1.525	0.763	0.5021
6	0.684	1.525	2.525	1.644	0.822	0.3766
7	0.763	1.644	2.644	1.733	0.867	0.2824
8	0.822	1.733	2.733	1.800	0.900	0.2118
9	0.867	1.800	2.800	1.850	0.925	0.1589
10	0.900	1.850	2.850	1.887	0.944	0.1191

3. Successive Over-Relaxation (SOR), with $\omega = 1.4$

0	0.000	0.000	0.000	0.000	0.000	1.9494
1	0.000	0.000	1.400	0.980	0.686	1.3190
2	0.000	0.980	2.212	1.637	0.871	0.7497
3	0.686	1.637	2.806	1.920	0.995	0.2343
4	0.871	1.920	2.965	2.004	1.005	0.0697
5	0.995	2.004	3.020	2.016	1.009	0.0125
6	1.005	2.016	3.014	2.010	1.003	0.0107
7	1.009	2.010	3.008	2.004	1.002	0.0073
8	1.003	2.004	3.002	2.001	1.000	0.0026
9	1.002	2.001	3.001	2.000	1.000	0.0009
10	1.000	2.000	3.000	2.000	1.000	0.0001

