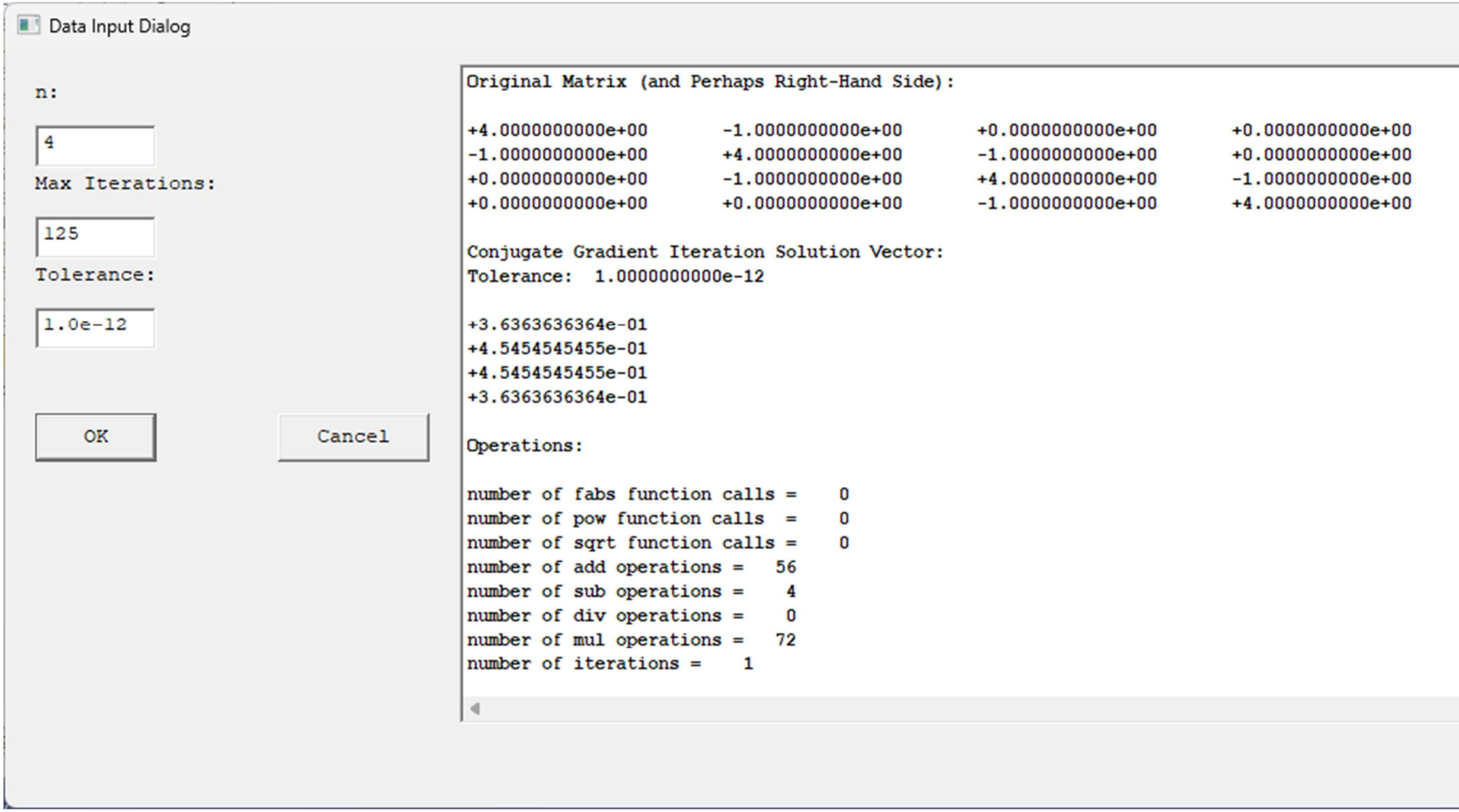
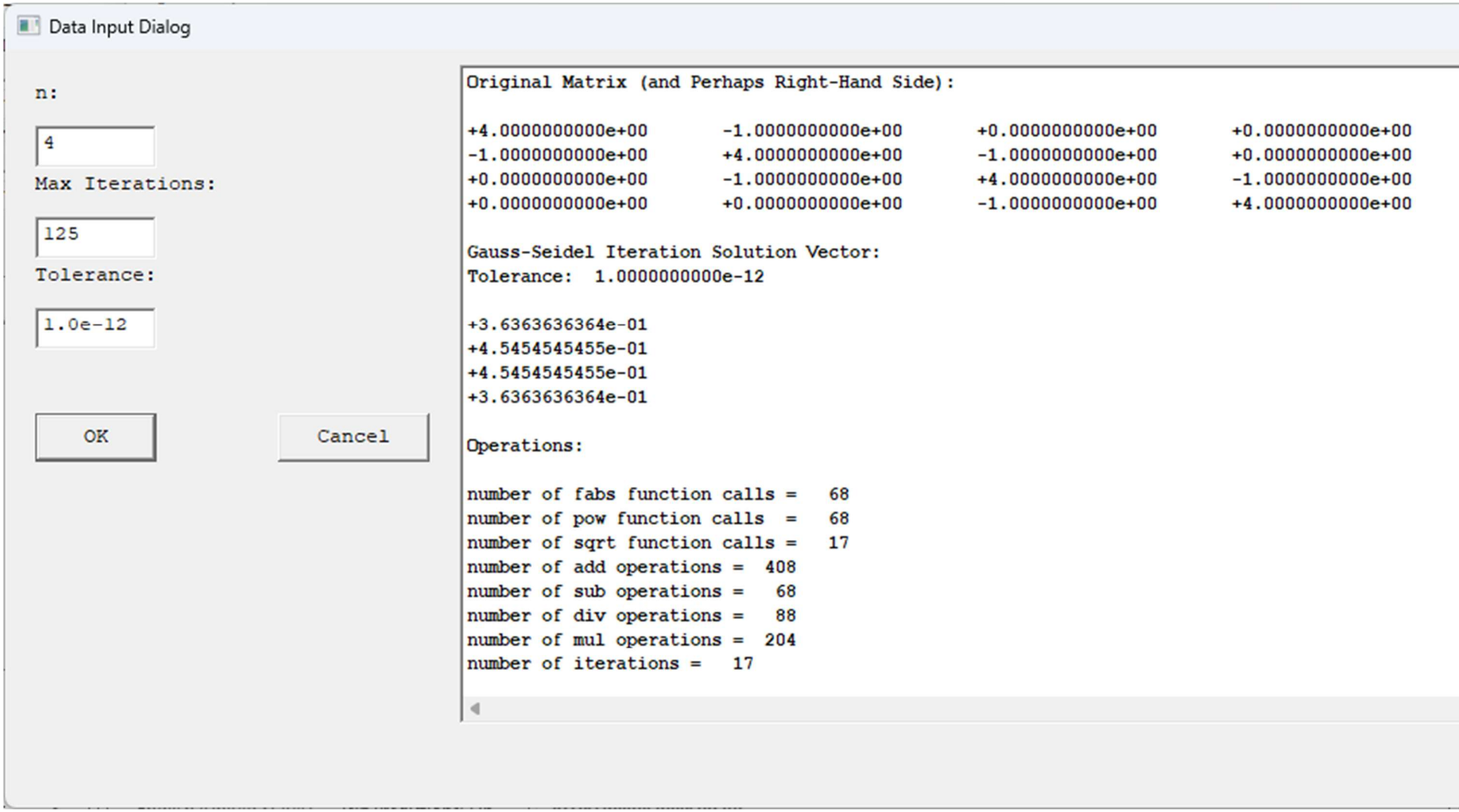
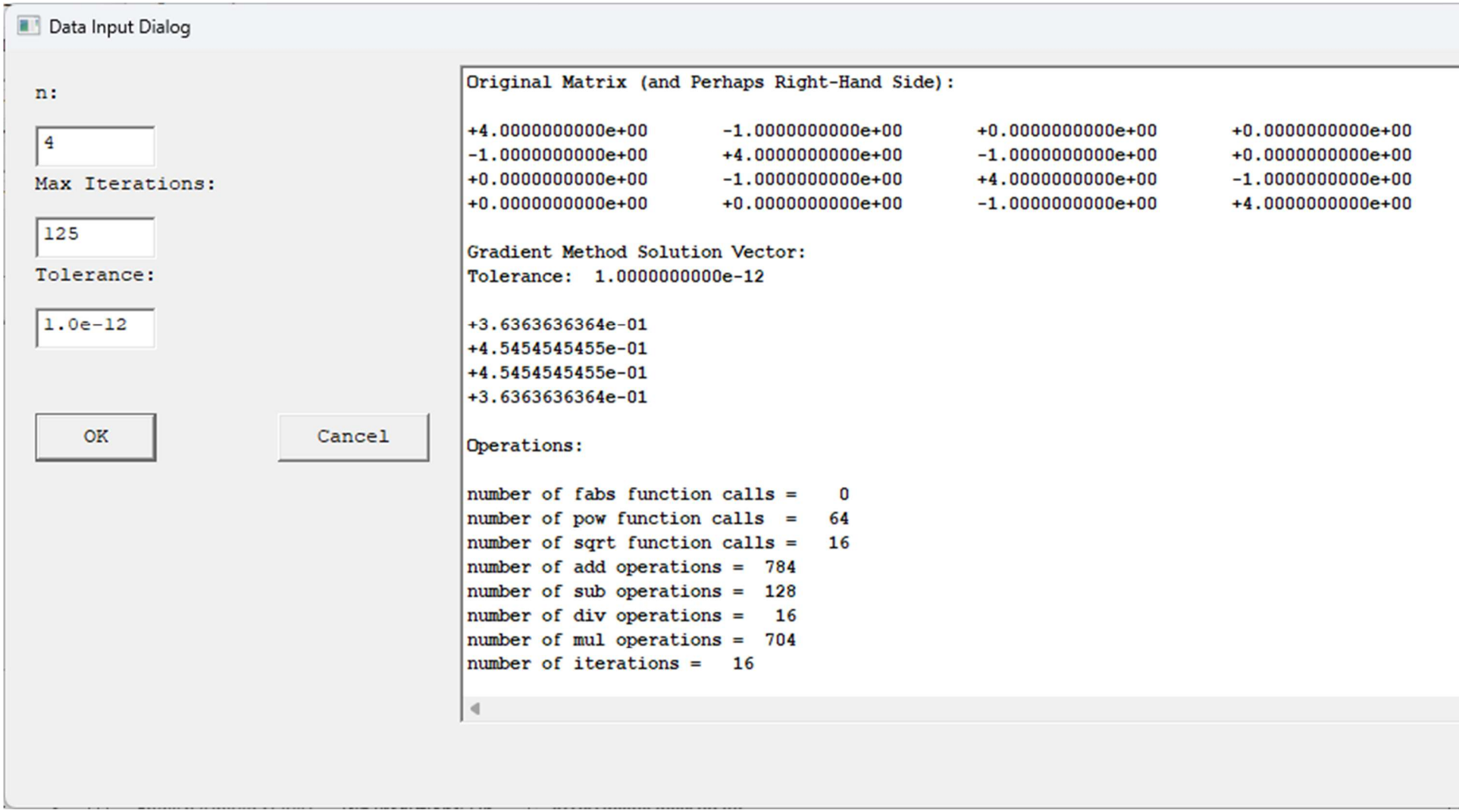
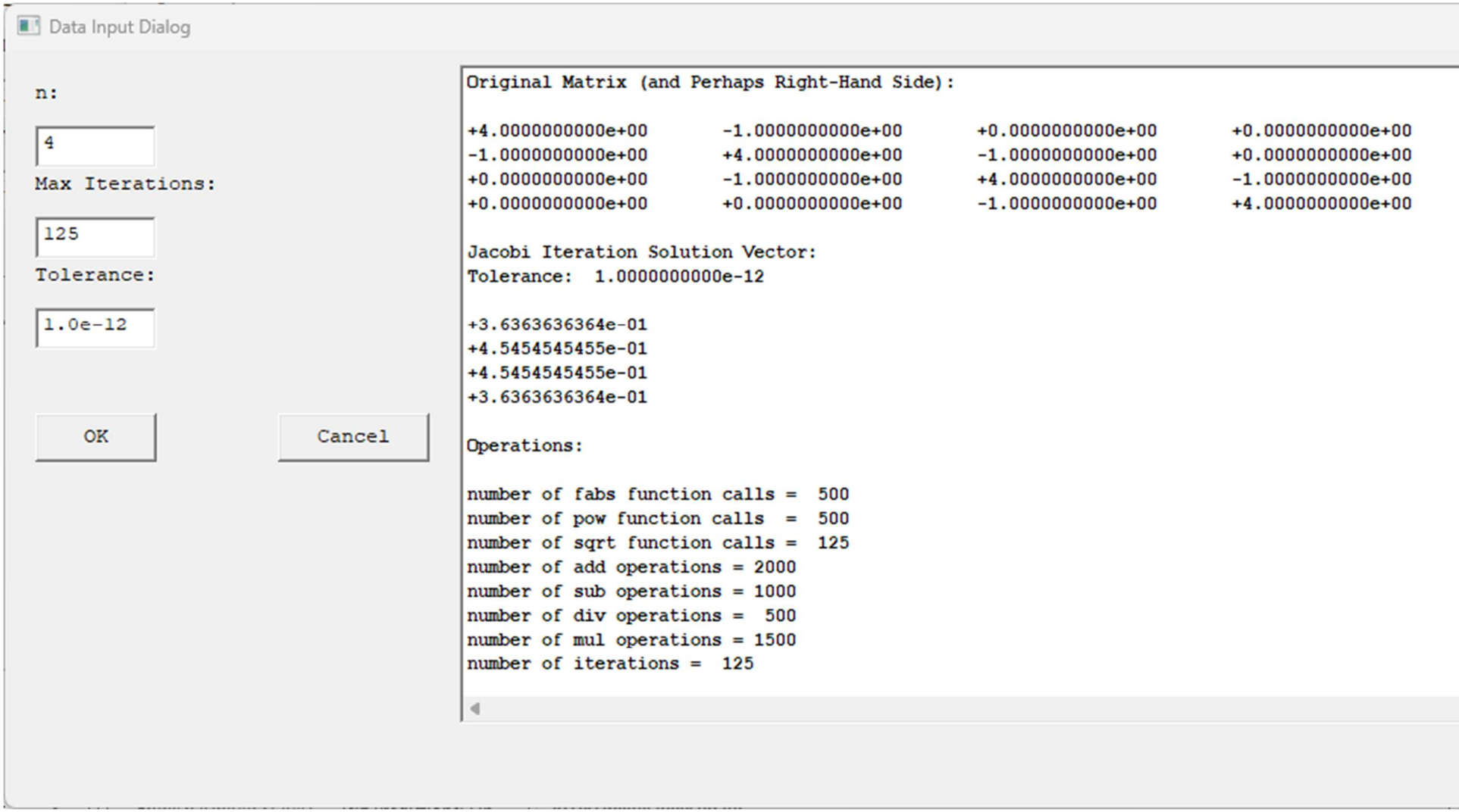
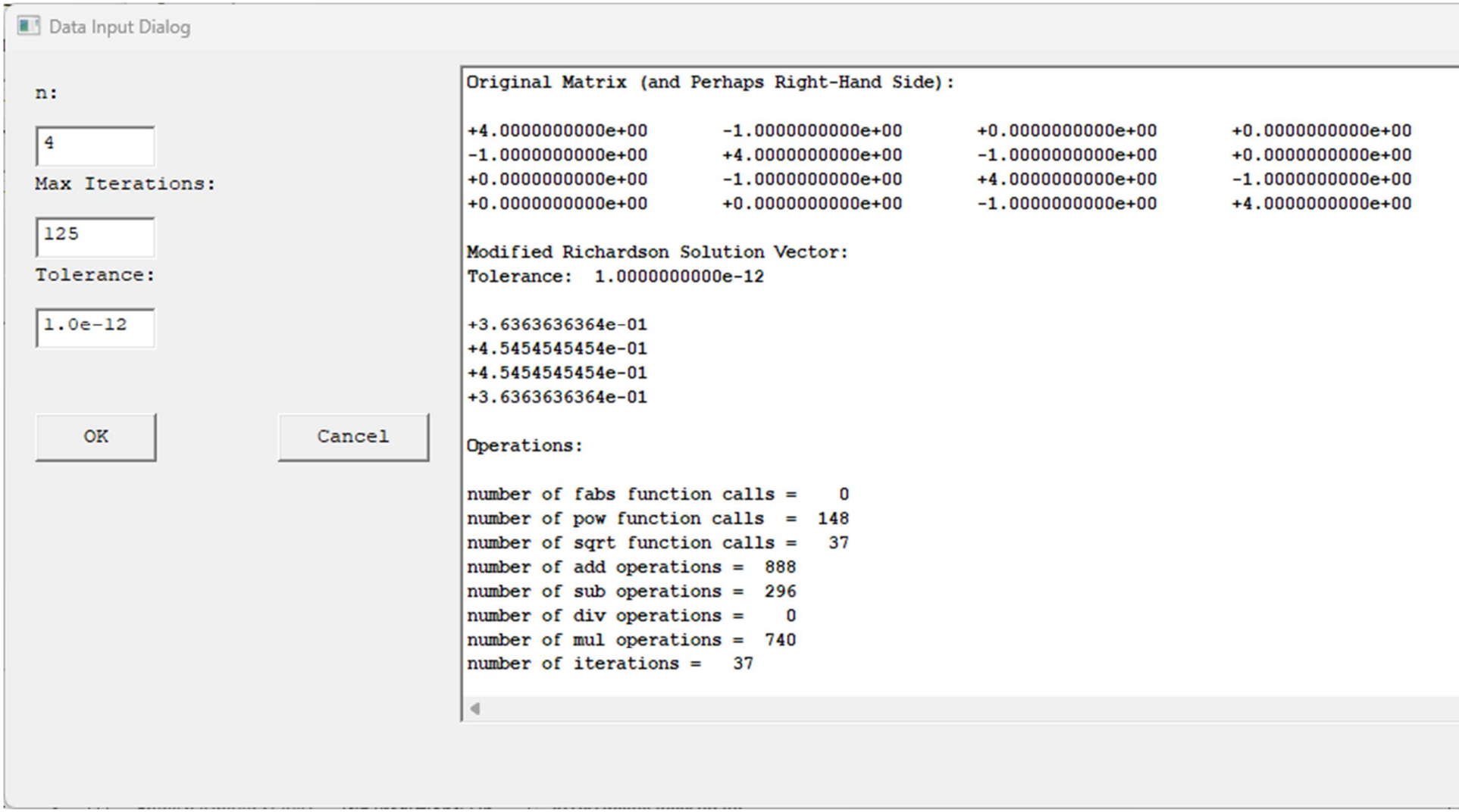
Blog Entry © Saturday, May 16, 2026, by James Pate Williams, Jr. Some More Linear Algebra Examples

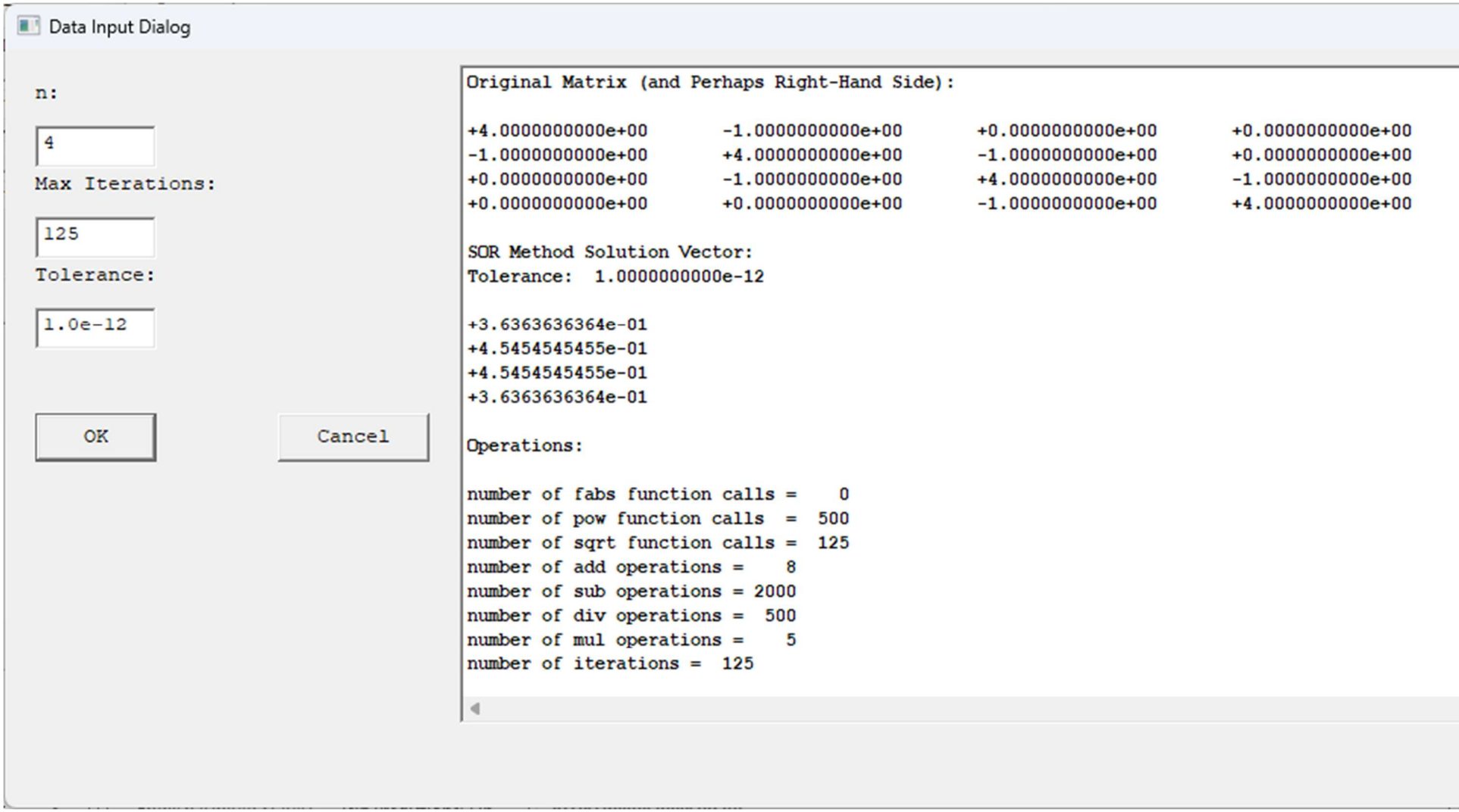



Data Input Dialog
n:
4
Max Iterations:
125
Tolerance:
1.0e-12
OK
Cancel
Original Matrix (and Perhaps Right-Hand Side):
+4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00 +0.0000000000e+00
-1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00
+0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00
+0.0000000000e+00 +0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00
Gauss-Seidel Iteration Solution Vector:
Tolerance: 1.0000000000e-12
+3.6363636364e-01
+4.5454545455e-01
+4.5454545455e-01
+3.6363636364e-01
Operations:
number of fabs function calls = 68
number of pow function calls = 68
number of sqrt function calls = 17
number of add operations = 408
number of sub operations = 68
number of div operations = 88
number of mul operations = 204
number of iterations = 17


Data Input Dialog
n:
4
Max Iterations:
125
Tolerance:
1.0e-12
OK
Cancel
Original Matrix (and Perhaps Right-Hand Side):
+4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00 +0.0000000000e+00
-1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00
+0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00
+0.0000000000e+00 +0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00
Gradient Method Solution Vector:
Tolerance: 1.0000000000e-12
+3.6363636364e-01
+4.5454545455e-01
+4.5454545455e-01
+3.6363636364e-01
Operations:
number of fabs function calls = 0
number of pow function calls = 64
number of sqrt function calls = 16
number of add operations = 784
number of sub operations = 128
number of div operations = 16
number of mul operations = 704
number of iterations = 16


Data Input Dialog
n:
4
Max Iterations:
125
Tolerance:
1.0e-12
OK
Cancel
Original Matrix (and Perhaps Right-Hand Side):
+4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00 +0.0000000000e+00
-1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00
+0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00
+0.0000000000e+00 +0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00
Jacobi Iteration Solution Vector:
Tolerance: 1.0000000000e-12
+3.6363636364e-01
+4.5454545455e-01
+4.5454545455e-01
+3.6363636364e-01
Operations:
number of fabs function calls = 500
number of pow function calls = 500
number of sqrt function calls = 125
number of add operations = 2000
number of sub operations = 1000
number of div operations = 500
number of mul operations = 1500
number of iterations = 125


Data Input Dialog
n:
4
Max Iterations:
125
Tolerance:
1.0e-12
OK
Cancel
Original Matrix (and Perhaps Right-Hand Side):
+4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00 +0.0000000000e+00
-1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00
+0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00
+0.0000000000e+00 +0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00
Modified Richardson Solution Vector:
Tolerance: 1.0000000000e-12
+3.6363636364e-01
+4.5454545454e-01
+4.5454545454e-01
+3.6363636364e-01
Operations:
number of fabs function calls = 0
number of pow function calls = 148
number of sqrt function calls = 37
number of add operations = 888
number of sub operations = 296
number of div operations = 0
number of mul operations = 740
number of iterations = 37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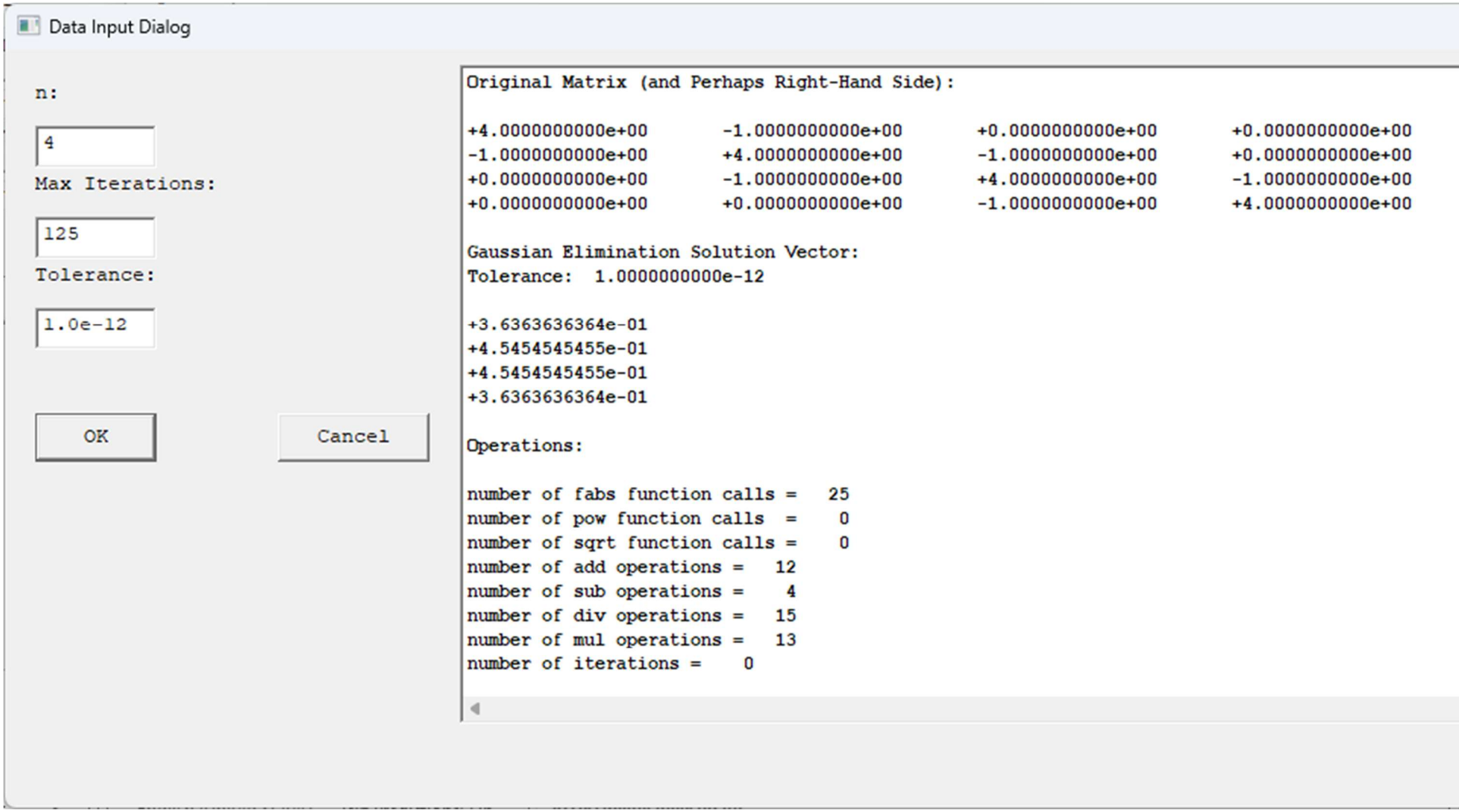
4
Max Iterations:
125
Tolerance:
1.0e-12
OK
Cancel
Original Matrix (and Perhaps Right-Hand Side):
+4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00 +0.0000000000e+00
-1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00
+0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00
+0.0000000000e+00 +0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00
SOR Method Solution Vector:
Tolerance: 1.0000000000e-12
+3.6363636364e-01
+4.5454545455e-01
+4.5454545455e-01
+3.6363636364e-01
Operations:
number of fabs function calls = 0
number of pow function calls = 500
number of sqrt function calls = 125
number of add operations = 8
number of sub operations = 2000
number of div operations = 500
number of mul operations = 5
number of iterations = 125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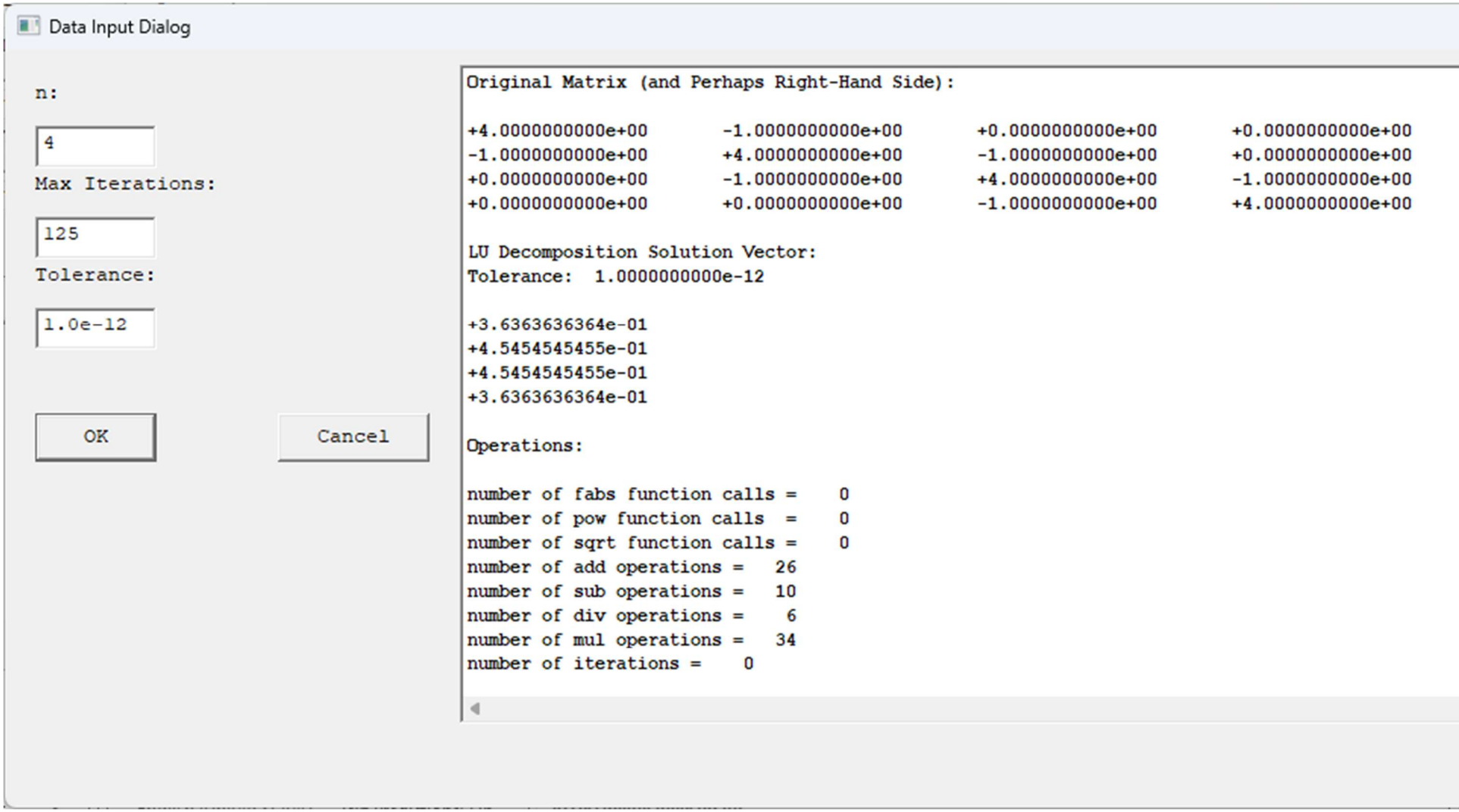
4
Max Iterations:
125
Tolerance:
1.0e-12
OK
Cancel
Original Matrix (and Perhaps Right-Hand Side):
+4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00 +0.0000000000e+00
-1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00
+0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00
+0.0000000000e+00 +0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00
Gaussian Elimination Solution Vector:
Tolerance: 1.0000000000e-12
+3.6363636364e-01
+4.5454545455e-01
+4.5454545455e-01
+3.6363636364e-01
Operations:
number of fabs function calls = 25
number of pow function calls = 0
number of sqrt function calls = 0
number of add operations = 12
number of sub operations = 4
number of div operations = 15
number of mul operations = 13
number of iterations = 0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Max Iterations:
125
Tolerance:
1.0e-12
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Cancel
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-1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00 +0.0000000000e+00
+0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00 -1.0000000000e+00
+0.0000000000e+00 +0.0000000000e+00 -1.0000000000e+00 +4.0000000000e+00
LU Decomposition Solution Vector:
Tolerance: 1.0000000000e-12
+3.6363636364e-01
+4.5454545455e-01
+4.5454545455e-01
+3.6363636364e-01
Operations:
number of fabs function calls = 0
number of pow function calls = 0
number of sqrt function calls = 0
number of add operations = 26
number of sub operations = 10
number of div operations = 6
number of mul operations = 34
number of iterations = 0