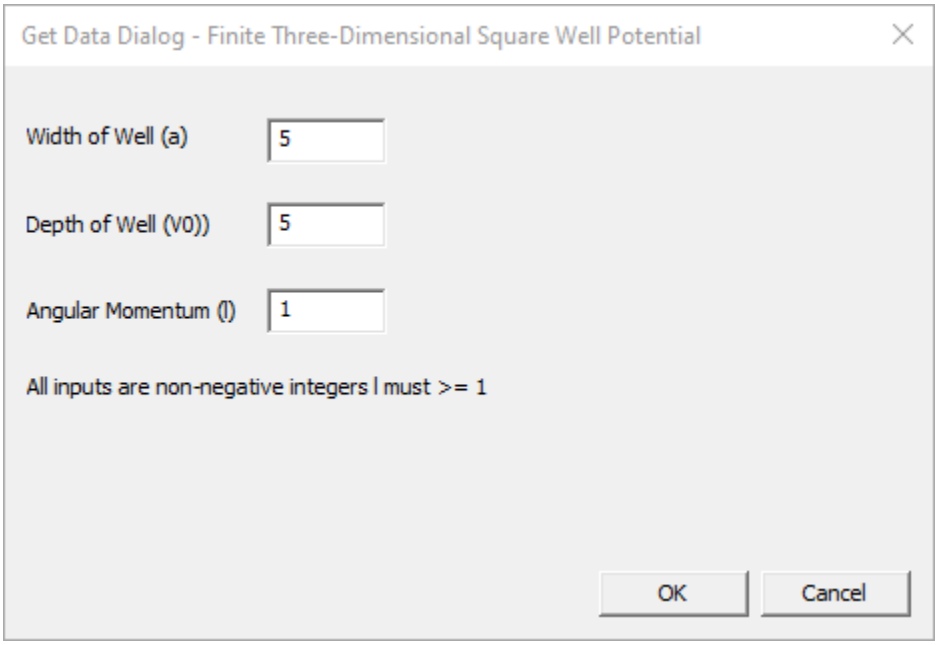
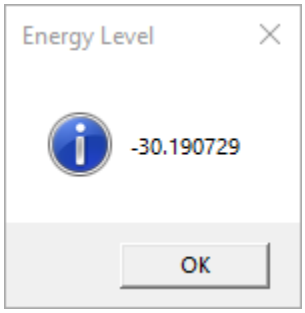
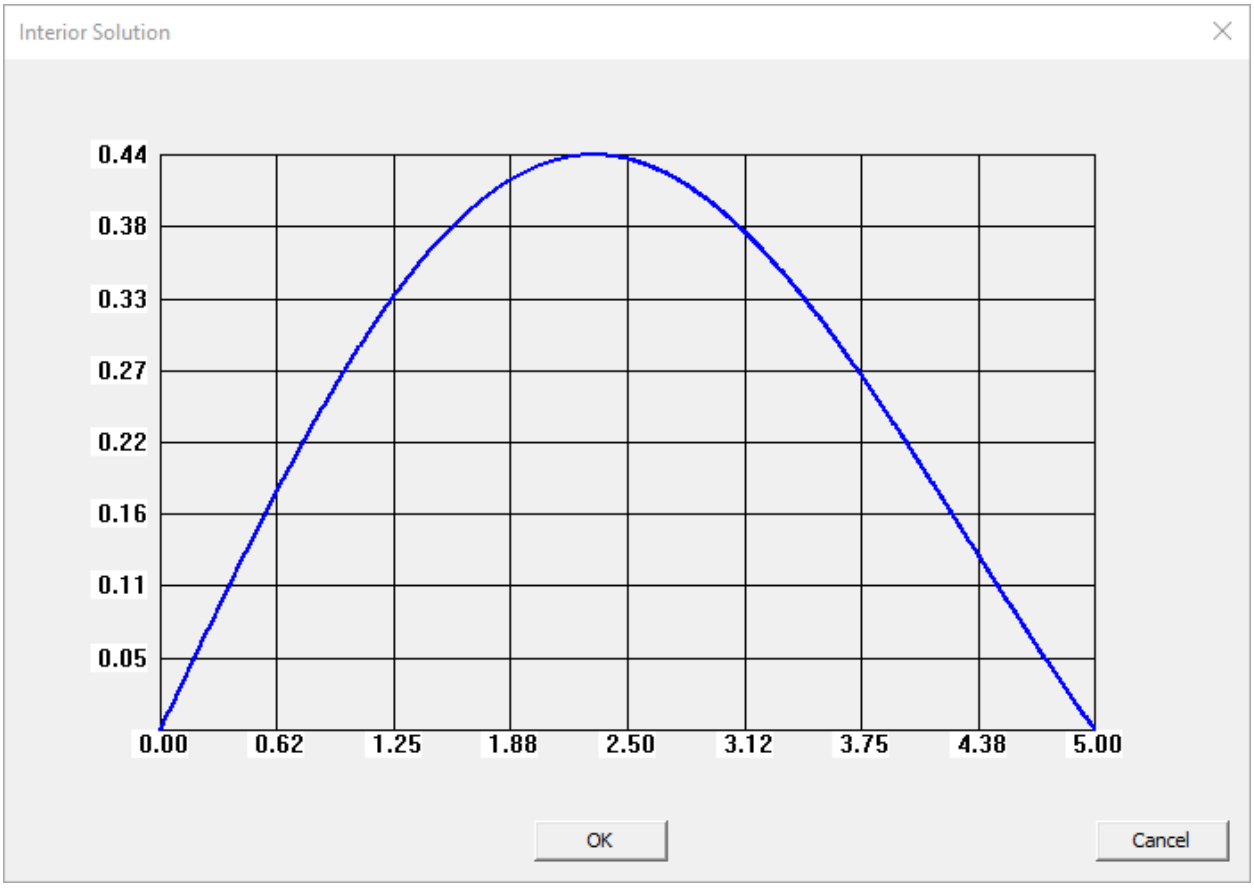
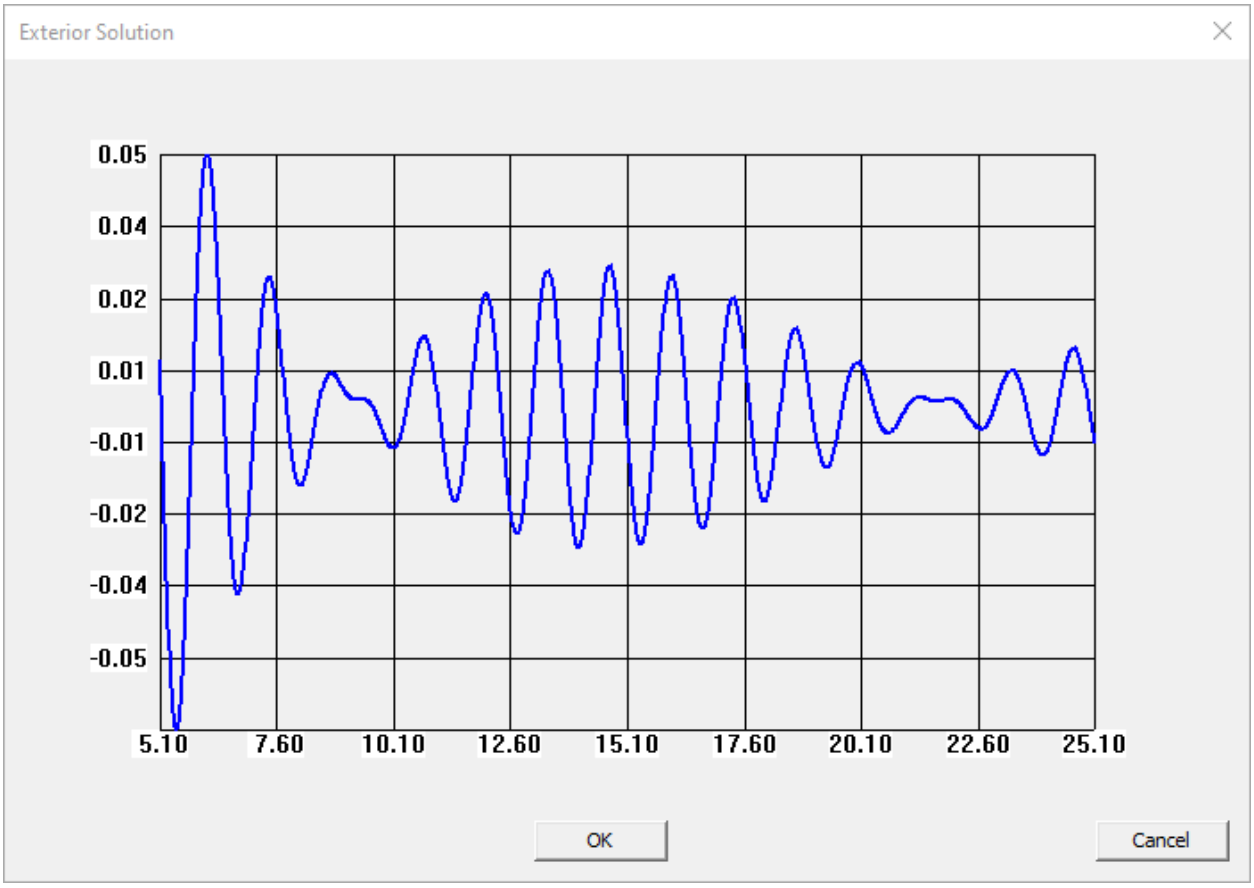
Blog Entry © Wednesday, November 6, 2024, by James Pate Williams, Jr. Particle in a Finite Spherical Three-Dimensional Potential Well

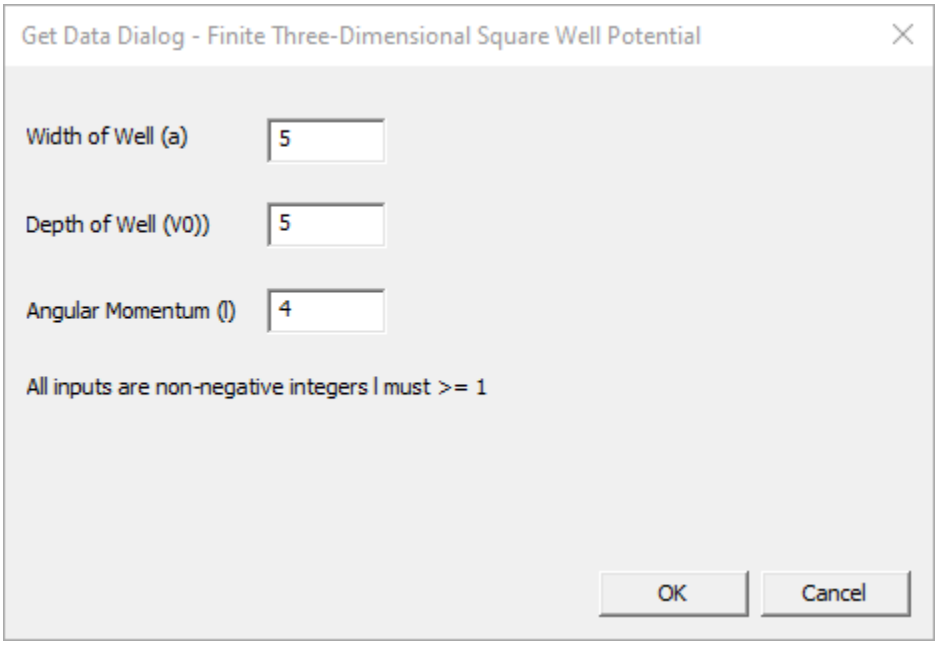
Based on the textbook example in ***Quantum Mechanics Third Edition*** by Leonard I. Schiff © 1968, I programmed a C++ application to draw solutions of the Schrödinger equation for both the interior and exterior of the potential energy well. These solutions involved spherical Bessel functions of the first and third kinds.

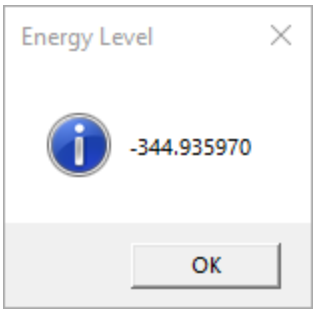


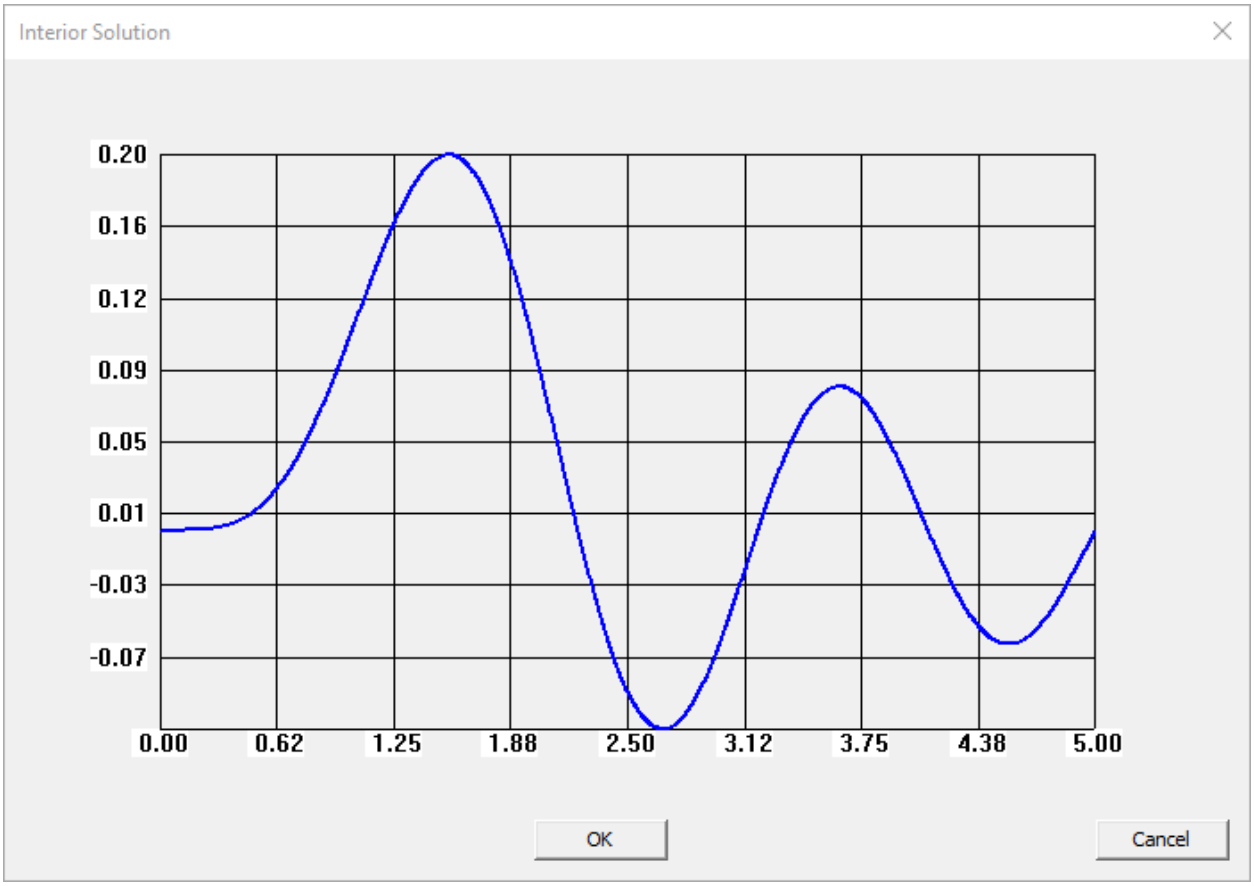


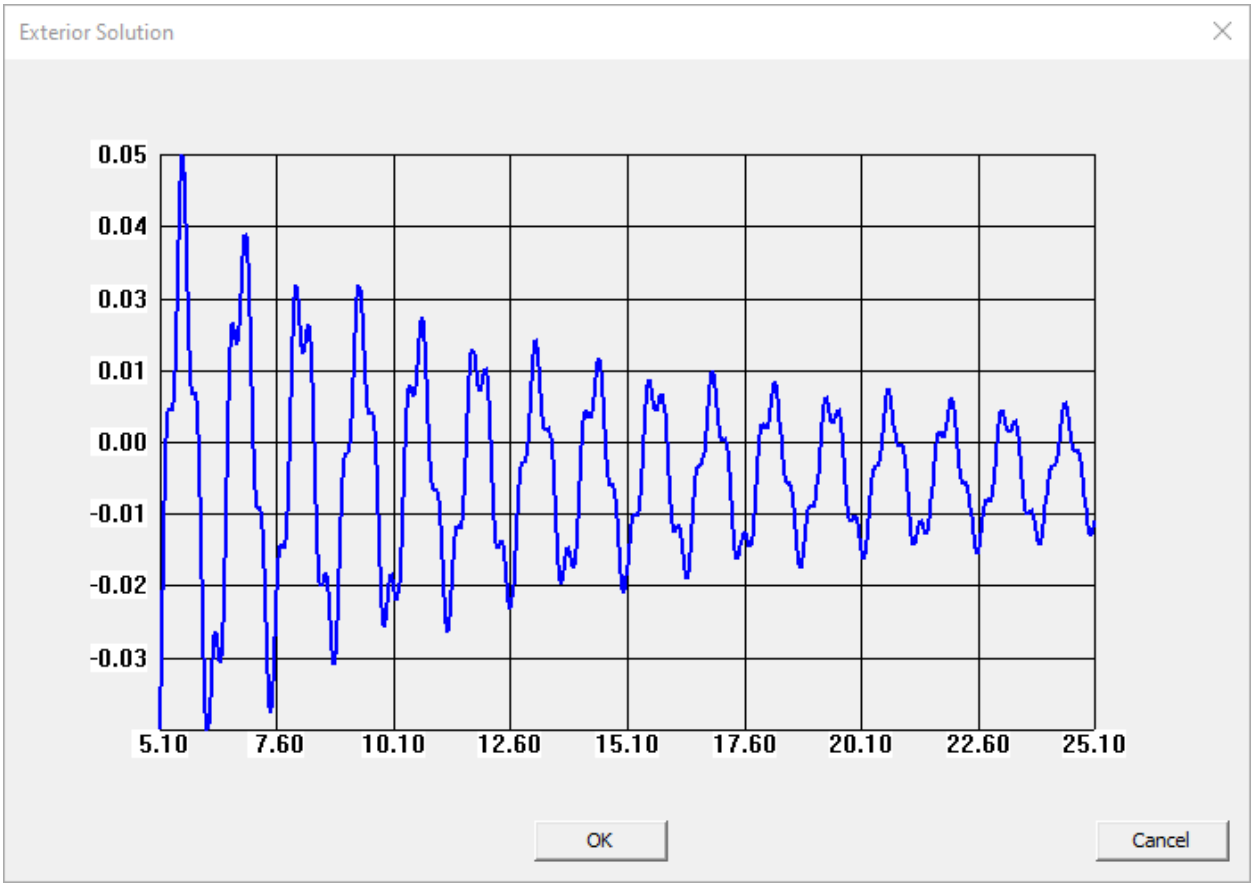

Interior Solution
0.44
0.38
0.33
0.27
0.22
0.16
0.11
0.05
0.00
0.62
1.25
1.88
2.50
3.12
3.75
4.38
5.00
OK
Cancel


Exterior Solution
0.05
0.04
0.02
0.01
-0.01
-0.02
-0.04
-0.05
5.10
7.60
10.10
12.60
15.10
17.60
20.10
22.60
25.10
OK
Cancel


Get Data Dialog - Finite Three-Dimensional Square Well Potential
Width of Well (a)
5
Depth of Well (V0))
5
Angular Momentum (l)
4
All inputs are non-negative integers l must >= 1
OK
Cancel


Energy Level
-344.935970
OK


Interior Solution
0.20
0.16
0.12
0.09
0.05
0.01
-0.03
-0.07
0.00
0.62
1.25
1.88
2.50
3.12
3.75
4.38
5.00
OK
Cancel


Exterior Solution
0.05
0.04
0.03
0.01
0.00
-0.01
-0.02
-0.03
5.10
7.60
10.10
12.60
15.10
17.60
20.10
22.60
25.10
OK
Cancel