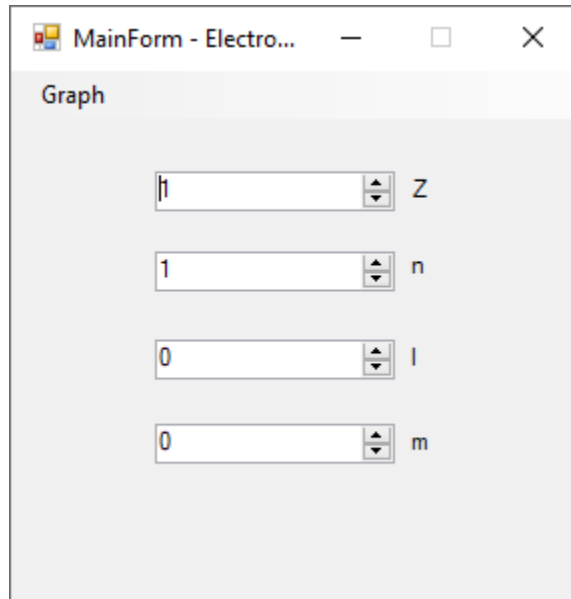Electron Probability Distribution Function Etc. C# Application Designed and Implemented by James Pate Williams, Jr. © December 2023 All Applicable Rights Reserved
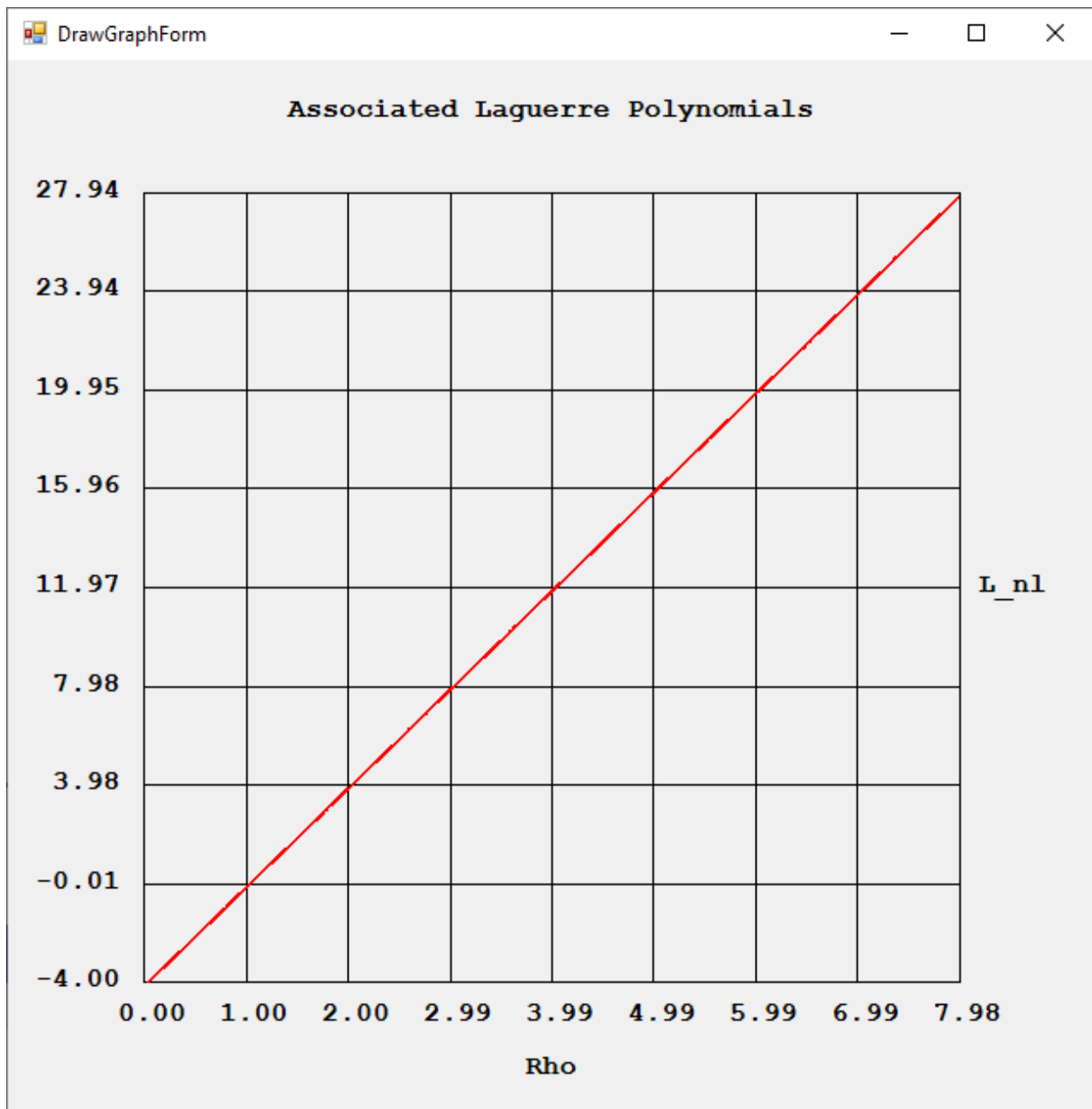
The opening menu data picker form:

Z is the atomic number beginning at 1 for Hydrogen. n is the principal quantum number, l is the azimuthal quantum number, and m is the magnetic quantum number. The Graph menu is shown below:
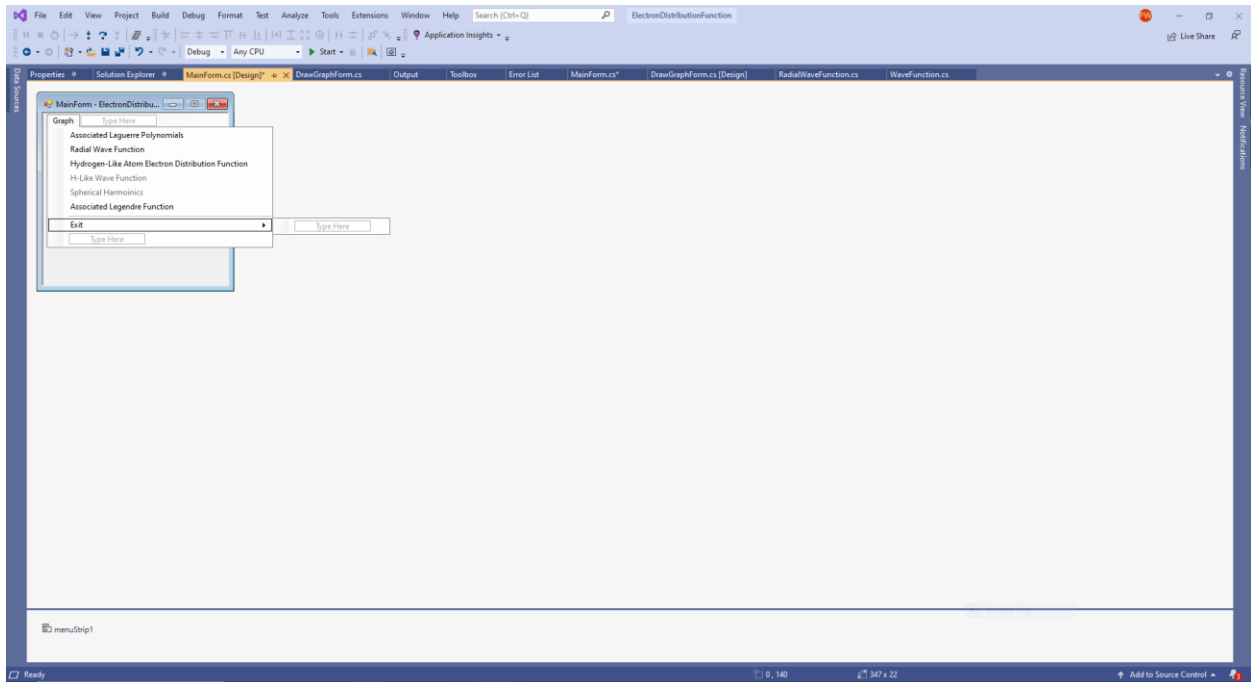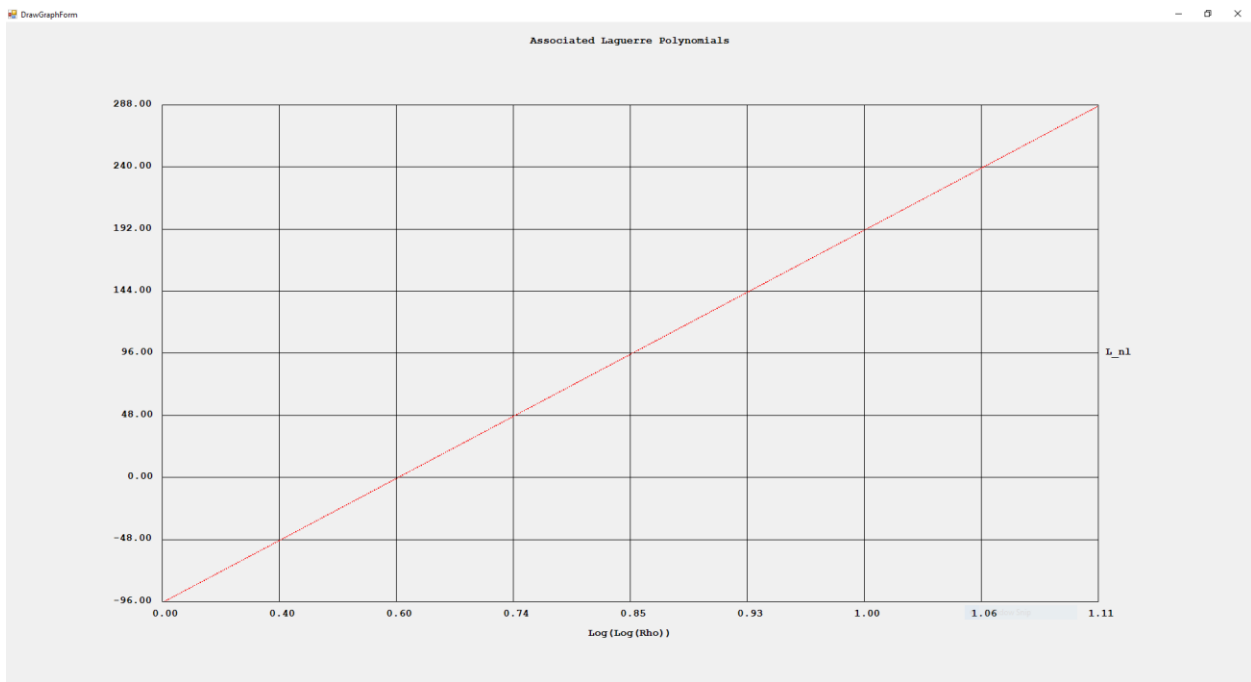

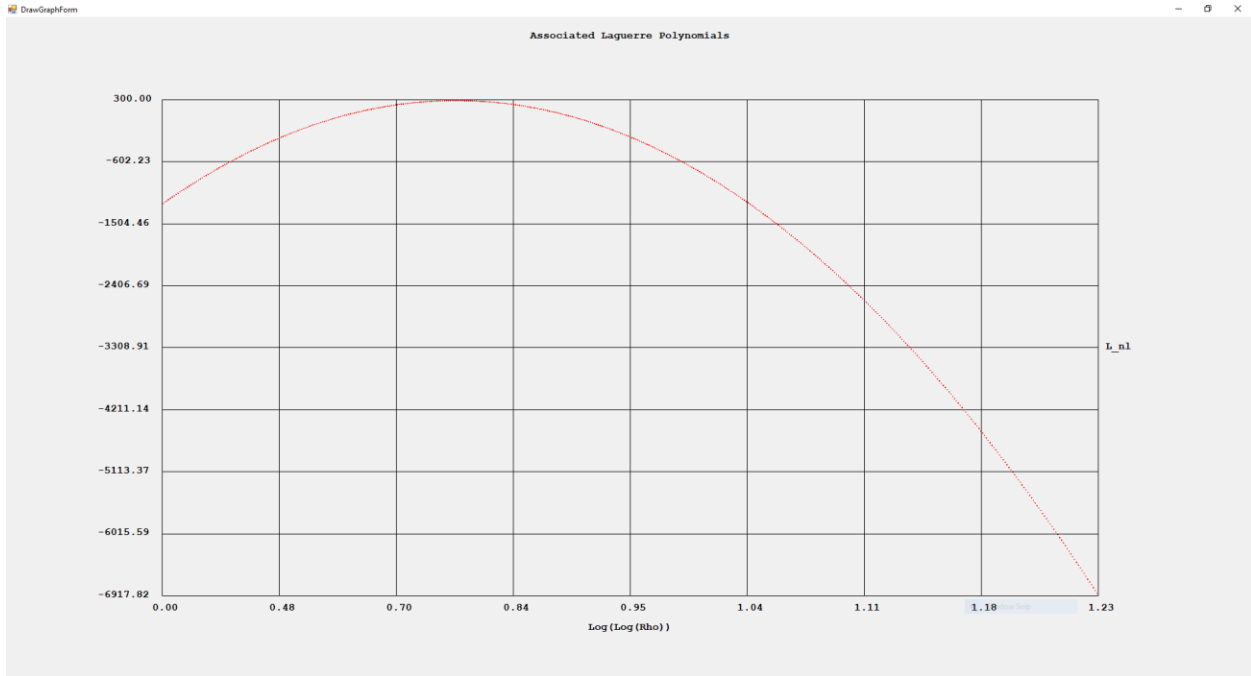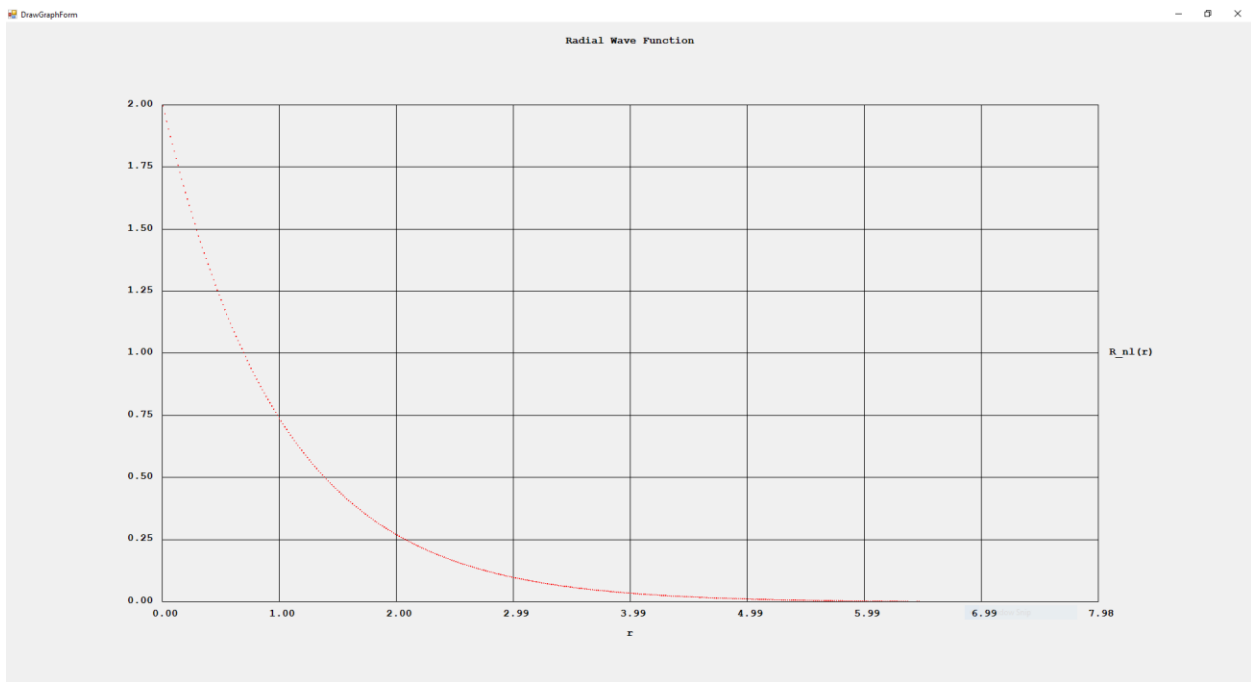We start off with the Associated Laguerre Polynomials. For Z = 2, n = 2, l = 0 we have:

Associated Laguerre Polynomials

For Z = 2, n = 3, l = 0 yields:

Let Z = 2, n = 3, l = 1:

Z = 2, n = 4, l = 1:

Associated Laguerre Polynomials
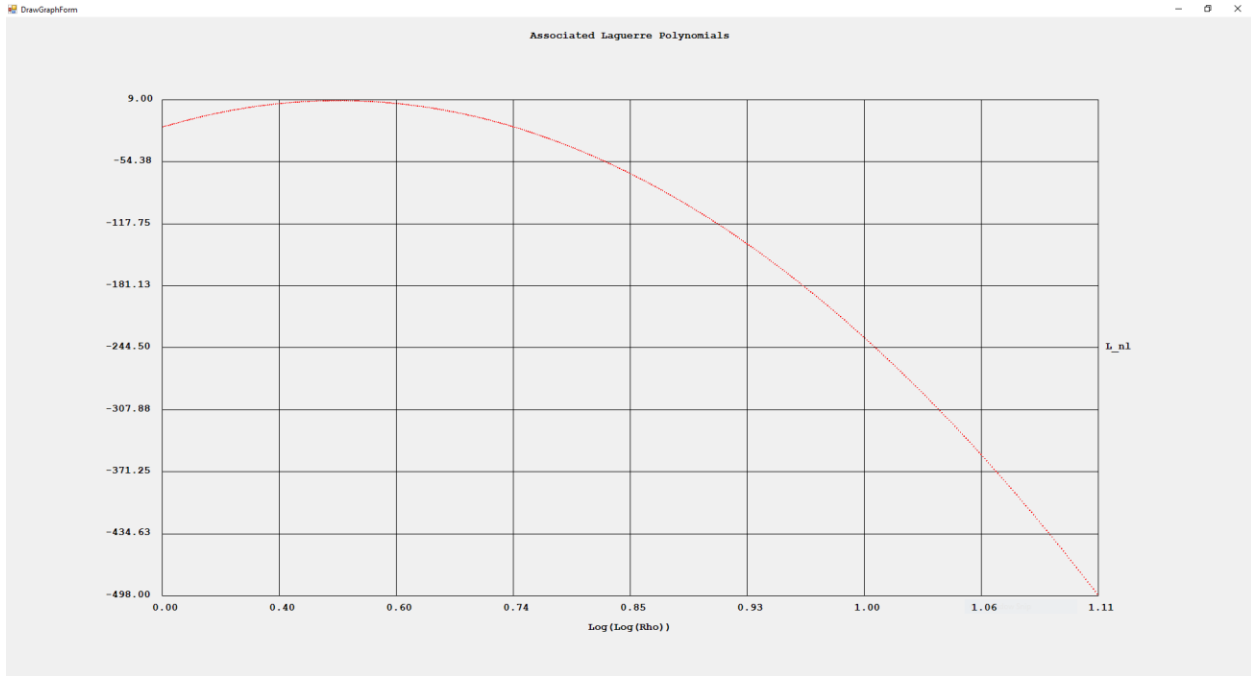
Results for the radial wavefunction: Z = 1, n = 1, l = 0:

Radial Wave Function
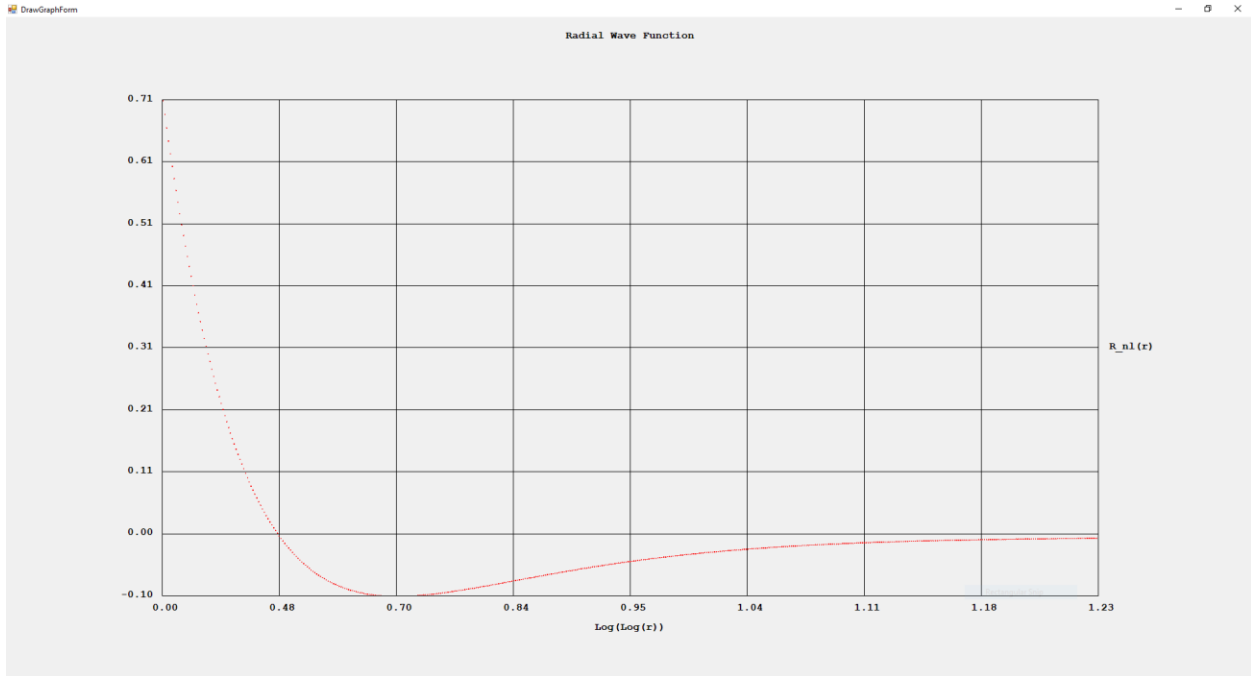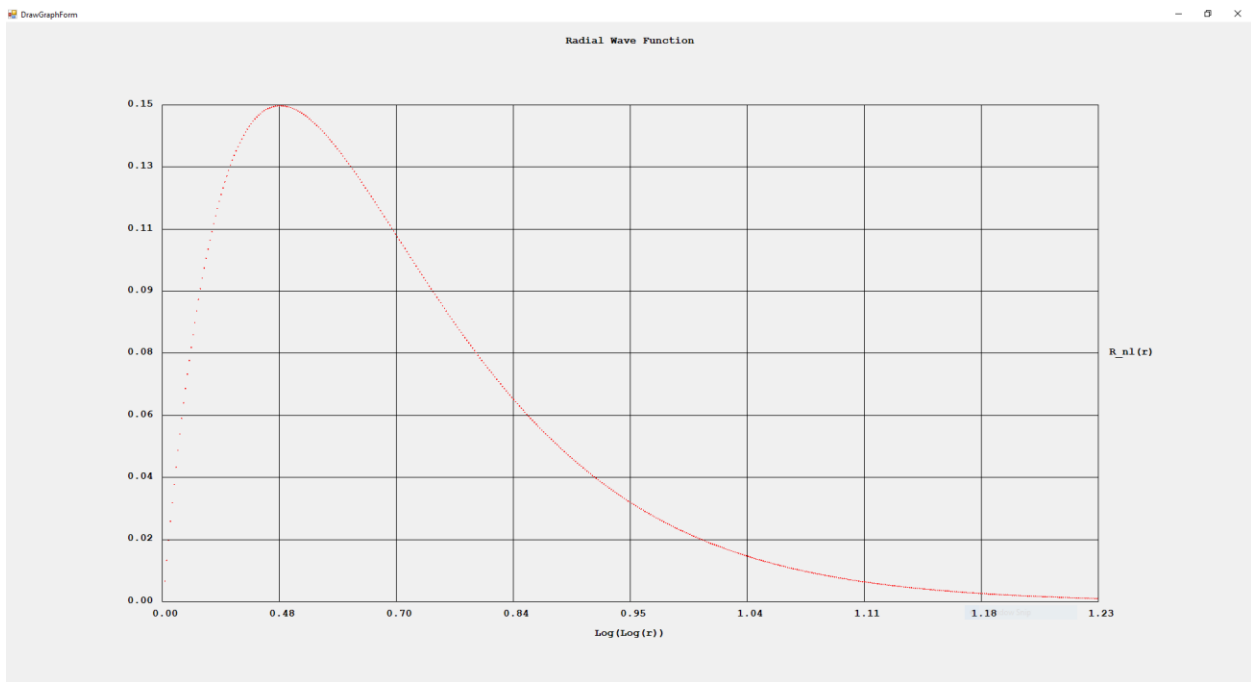
Z = 1, n = 2, l = 0:

Z = 1, n = 2, l = 1:

Z = 1, n = 3, l = 0:

Z = 1, n = 3, l = 1:

Z = 1, n = 3, l = 2:

Now we move onto the hydrogen-like atom electron probability distribution function (PDF, not to be confused with a Portable Document File (another PDF). Z = 1, n = 1, l = 0:

Z = 1, n = 2, l = 0:

Electron Radial Distribution Function
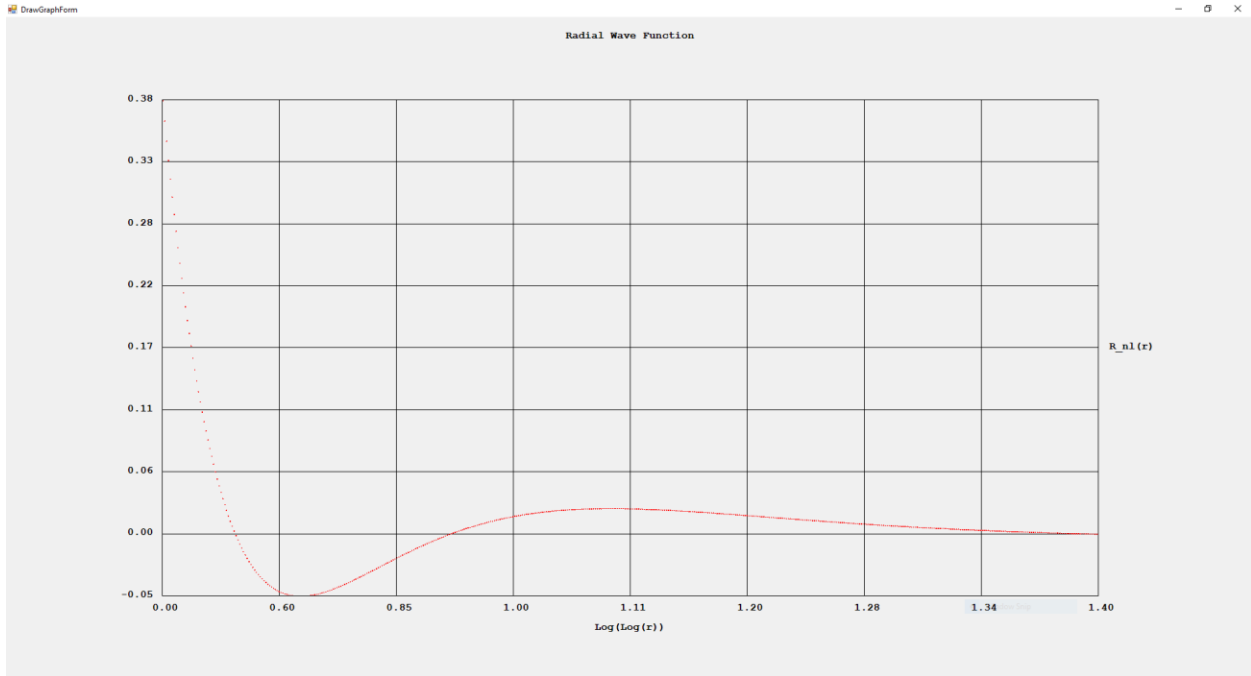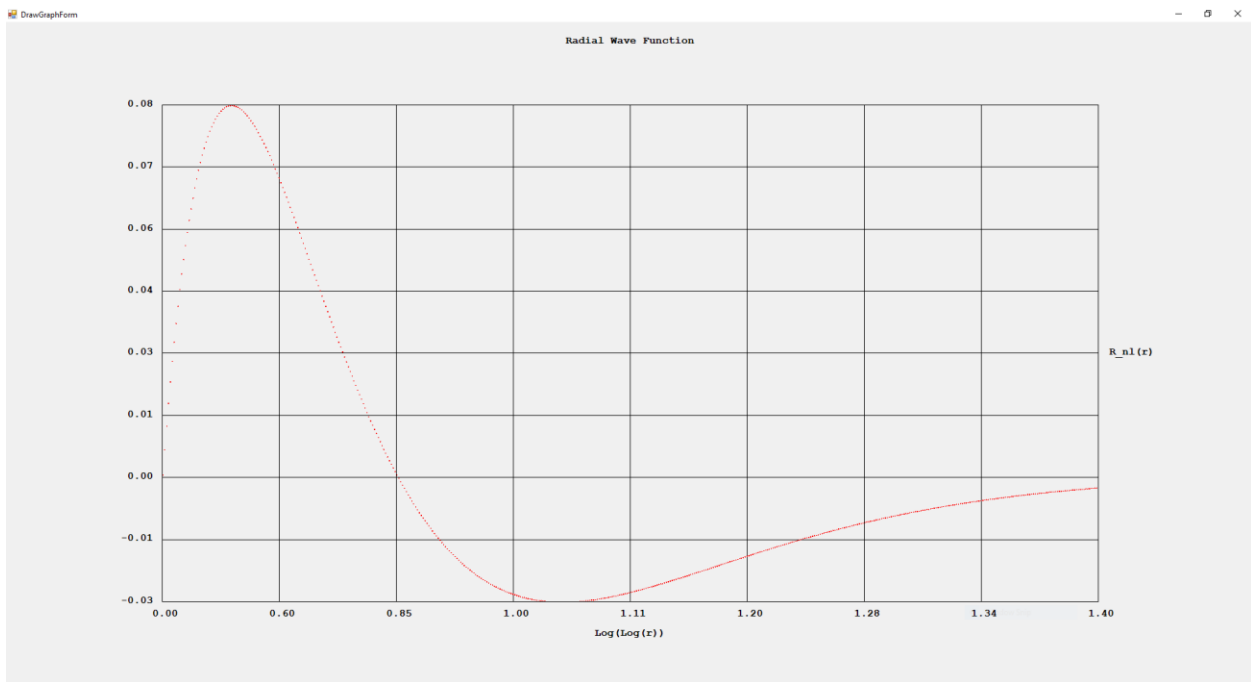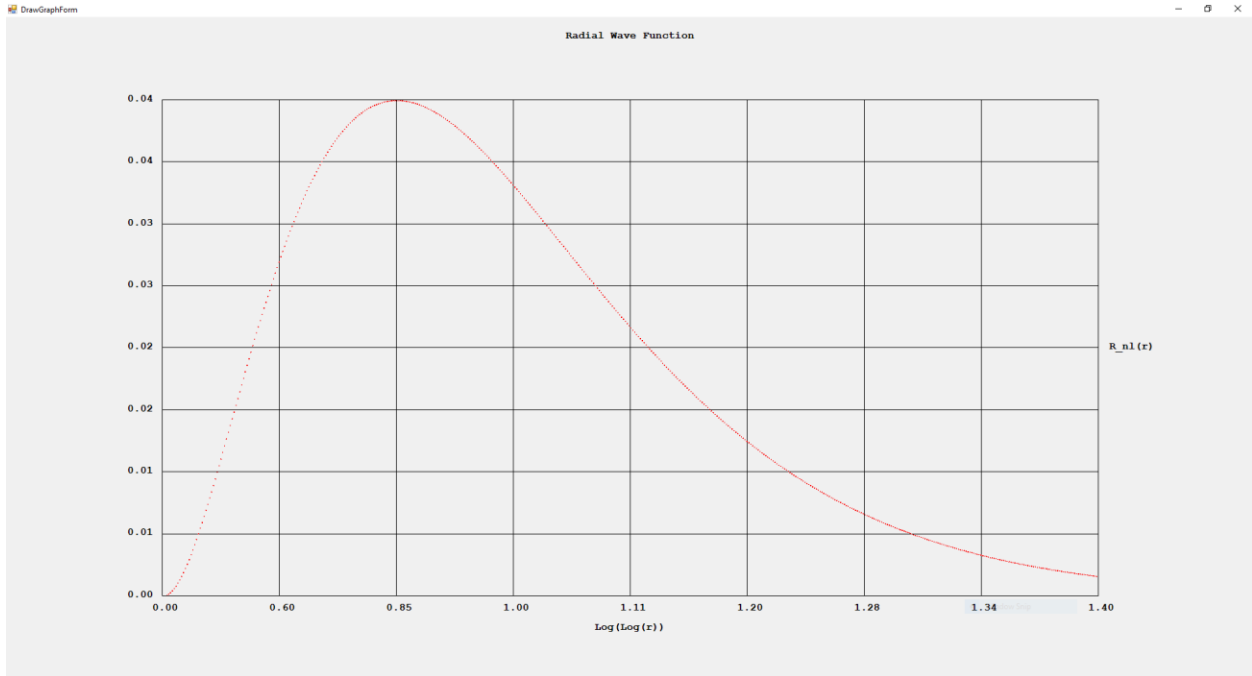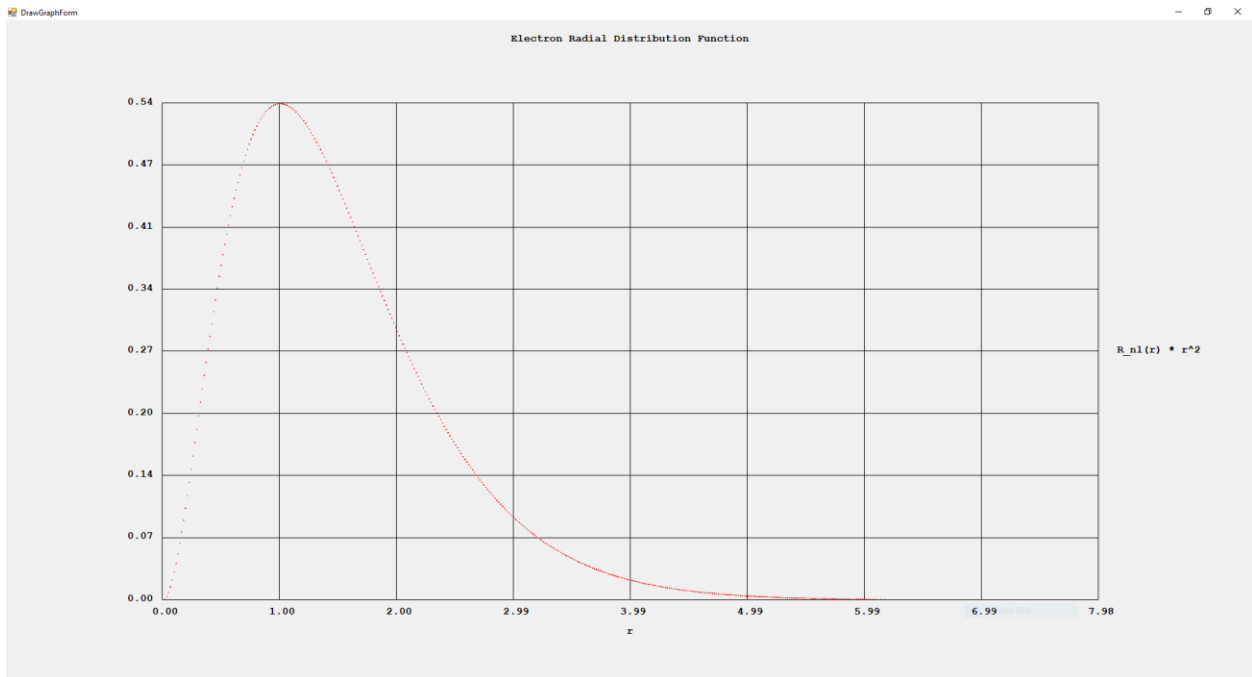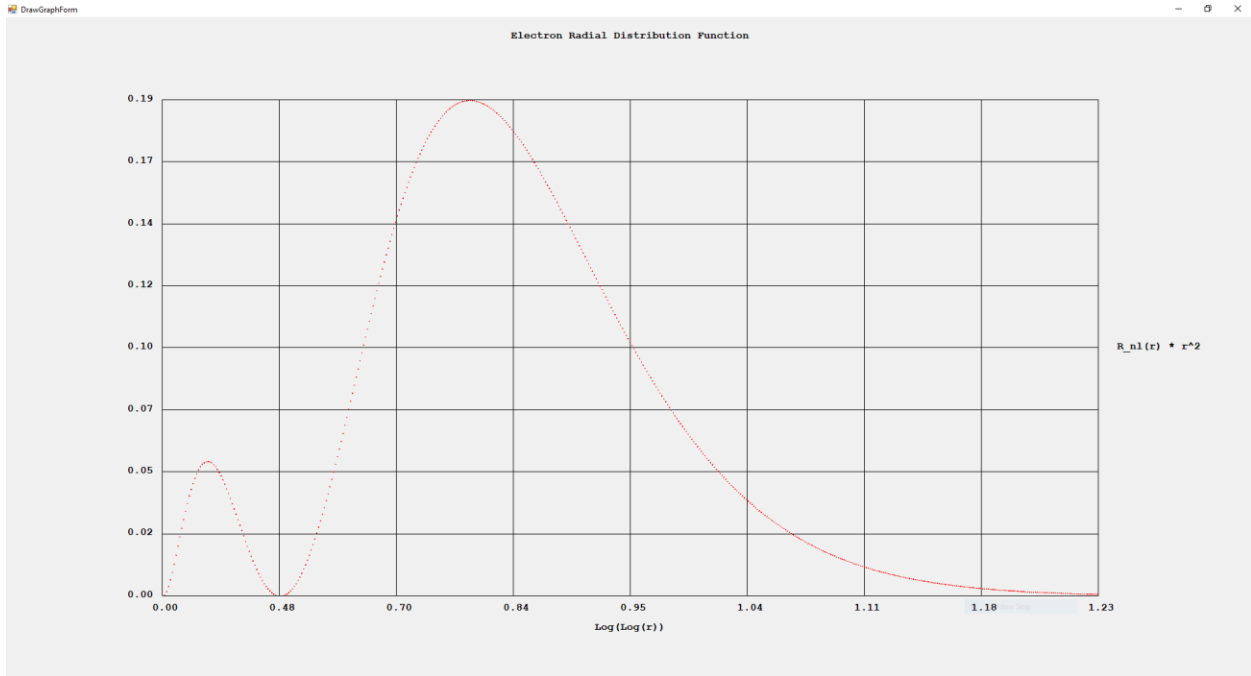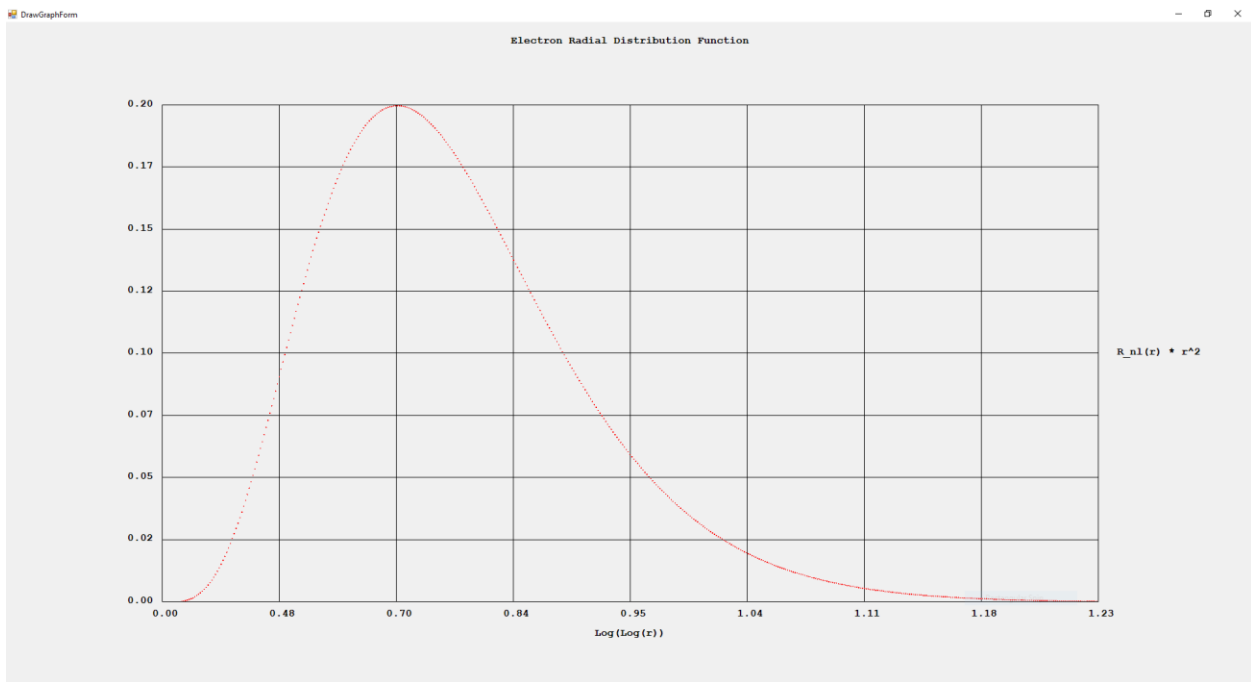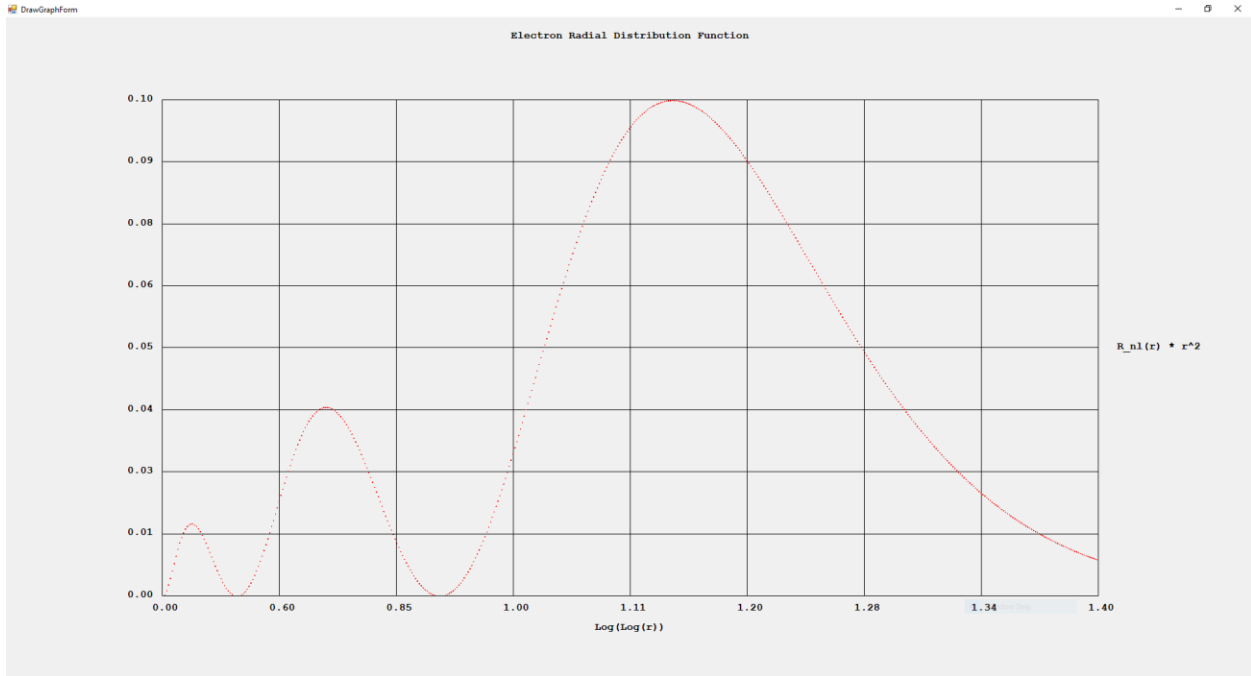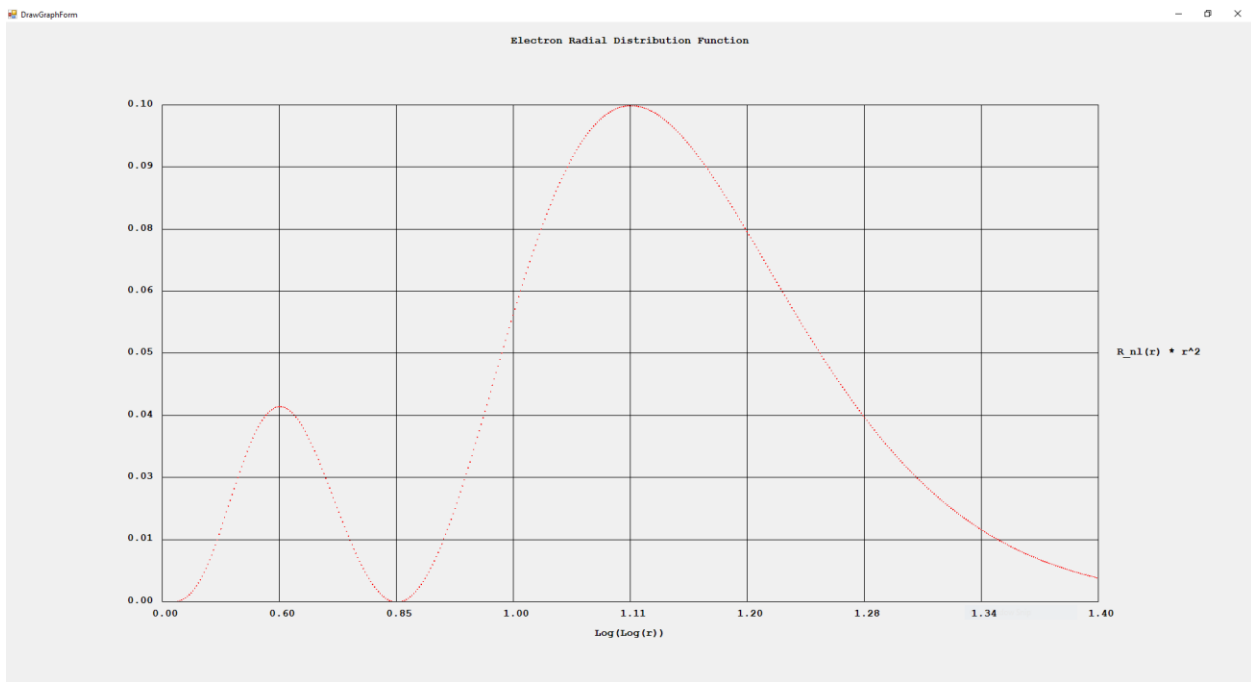
Z = 1, n = 2, l = 1:

Electron Radial Distribution Function
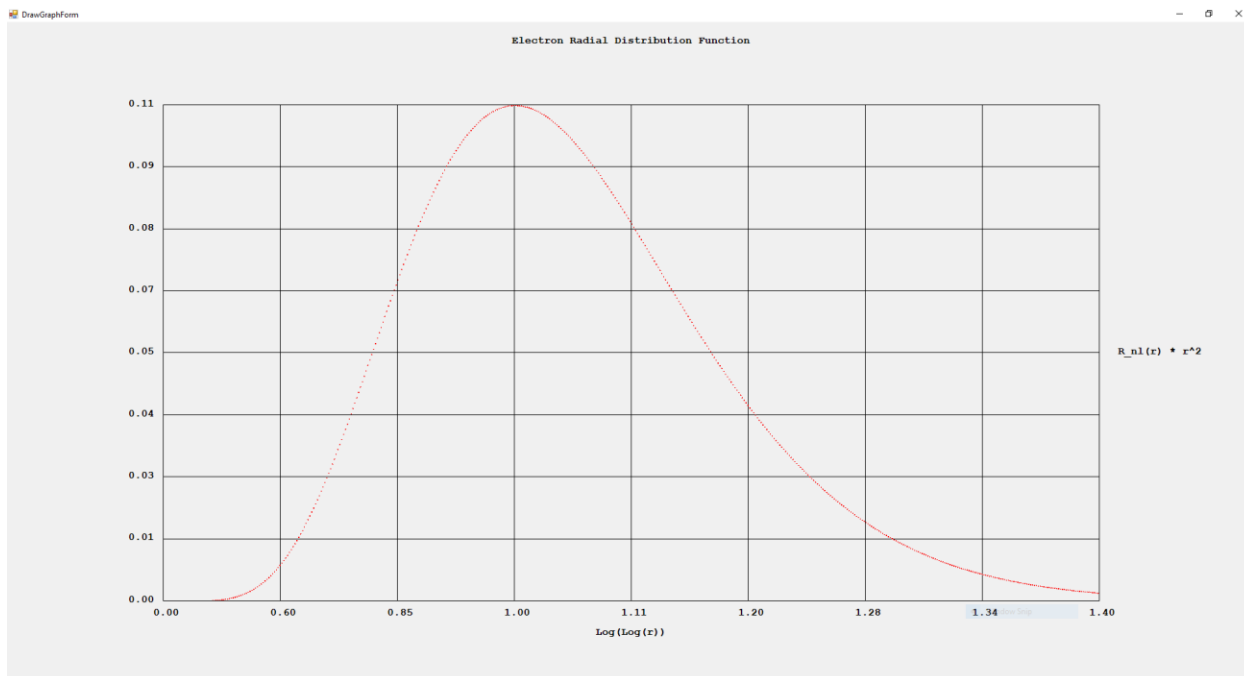
Z = 1, n = 3, l = 0:

Z = 1, n = 3, l = 1:

Z = 1, n = 3, l = 2:

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