Write-up for Homework1

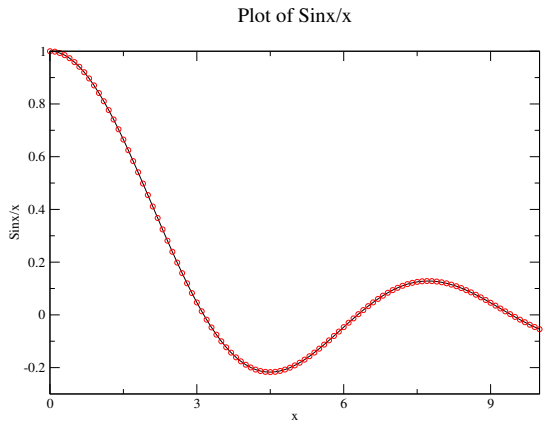
August 28, 2016

1 Bessel Function

In the given problem, as we can clearly see the function is divergent when the value of x tends to zero. Now, to avoid this situation I have choosen a particular value of ep = 0.001 and then used Taylor expansion of the given function for evaluating the value of given function in the range [0,0.001]. And for above this value i.e. in the interval [0.001,10] we evaluate the given function.

The code file to run this command is saved and included in the filename f1ofx.f90 and plotf1ofx.f90, data file in the filename f1ofx_data.dat, and the xmgrace plot in the filename sin.eps. in the folder-name prob1.

The plot I thus obtained for the given function is as shown below:

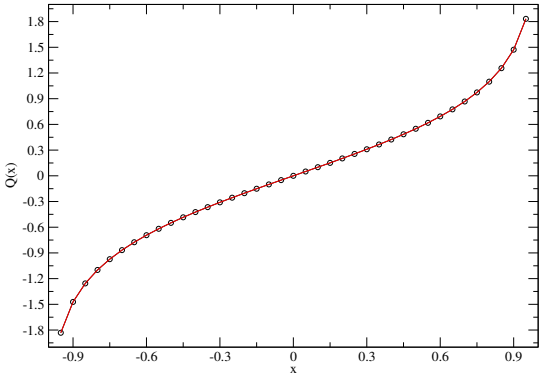


2 Legendre function

Qo(x):

To find the value of the given function in the interval [-0.95,0.95], the code file I executed is saved and included in the filename f1ofx.f90 and plotf1ofx.f90, data file in the filename f1ofx_data1.dat, and the xmgrace plot in the filename b.eps. in the sub folder qo inside the folder prob2.

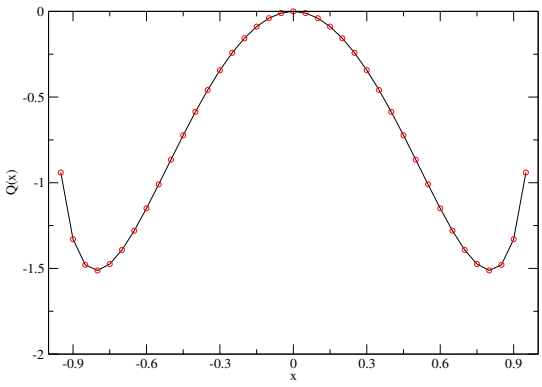
The plot I thus obtained for the given function is as shown below:



Q3(x):

To find the value of the given function in the interval [-0.95,0.95], the code file I executed is saved and included in the filename f1ofx.f90 and plotf1ofx.f90, data file in the filename f1ofx_data2.dat, and the xmgrace plot in the filename q44.eps. in the sub folder q3 inside the folder prob2.

The plot I thus obtained for the given function is as shown below:



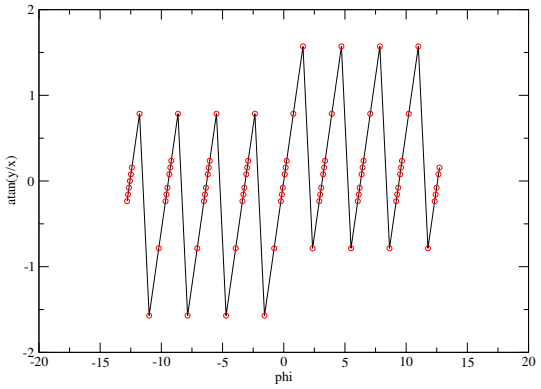
3 Complex Numbers

In order to get the computer to print a table as provided in homework problem, the code file I executed is saved and included in the filename cnumbers.f90, data file in the filename a.dat, and the xmgrace plot of the output phases obtained with the arctangent funcstions versus the input phase (phi) in the filename atan.eps and atan2.eps in the folder prob3.

From plotting the graph of corresponding functions we clearly see that , we have a cut on points (0.785,-1.57) and (1.57,-0.785) for atan(y/x), on the points (3.06,-3.06) for atan2(y,x), points (0.999,-0.993) for sqrt(z) and points (-3.06,3.06) for ln.

The plot I thus obtained for the given function is as shown below:

Plot of atan(y/x) v/s phi



Plot of atan2(y,x) vs phi