I. EXERCISES - SESSION 6

A. Comments on Sessions:

The goals of this session are the following:

1. Using gsl libraries
2. Root finding

Everyone attempts all the problems!

B. Preparations:

Preparations: Download the tar file session06.tar.gz

www.physics.iitm.ac.in/~suna/nummethods.html

under the section DCF sessions. Untar the file and move into the correct directory.

C. Problems:

1. Root finding: Write functions (subroutines) that can calculate the roots of an equation using the following methods:

   (a) Bisection (You have already been given this one along with a main code)

   (b) Newton-Raphson Method

   (c) Secant Method

   You should be able to use the main program root_find_test.c to call these functions. Write appropriate makefiles, compile and test the codes for the case already built in the main code namely

   $$f(x) = x^2 - R \tag{1}$$

   Set $R = 13$. What are the results you get and how many iterations does each method need in order to converge to the final result?

2. Interpolation using gsl splines: Use the gsl library functions and write a code that does cubic spline interpolation. (Refer to the gsl manual online as well as the examples within). Test your code by interpolating the data from last week (sample_test.dat) using the spline interpolation. (Hint: look at the interpolation example at the website first!)