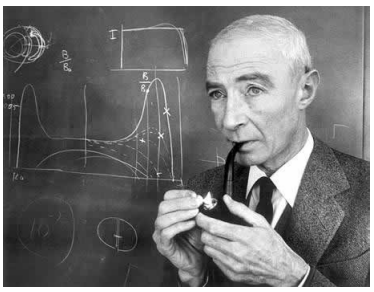
Physics 4350 Computational Physics
Problem Set #8



No person should escape our universities without knowing how little they know. - *J. Robert Oppenheimer (technical director of the Manhattan project)*

1. Method of images for the diffusion equation. Garcia chapter 6, problem 4.
2. Neutron diffusion. Garcia chapter 6, problem 11.
3. Critical mass and tamper. Garcia chapter 6, problem 14.
4. Spectral method for diffusion equation. Use the Octave source code provided on MyGateway (diffusion.m) for this problem.
   (a) Modify diffusion.m to handle general initial temperature distributions that are not limited to even functions. Demonstrate the results for an initial distribution that is a normalized step function from x=0 to x=L/4.
   (b) Modify the code to include a heat source at the middle of the bar. (See the approach to the analytical problem for neutron diffusion in the text for how to handle this in section 6.3.) Starting from the initial condition in part (a), show the time dependence of the solution tends to a steady state that you expect.