Pset 5. Due 6/26/15.

Problem 1: Eigenvalue problem.

- Consider a potential well with infinite depth and zero potential inside the well. Solve the Schrodinger equation in a steady state to find the theoretical eigenvalue and eigenfunction.

- Set up the corresponding linear algebra problem. Derive the eigenvalue formula for the second difference matrix.

- Write a code to compute the numerical eigenvalue and eigenvector.

- Make a graph to compare the numerical eigenvalue with the eigenvalue formula and theoretical eigenvalue.

Problem 2: Finite element method.

Solve the Poisson equation in your first homework using finite elements with three hat functions. Check if the approximation from the finite element matches the exact solution at the nodes.