Assignment 2
Weeks 2-3

Review class notes and Chapters 3 and 4 from the book. A sample exam has been posted at www.pitt.edu/~sksaxena (follow link to teaching). You should be able to answer problems 1, 2a, 2b, and 4 – if concepts are unclear please make sure to get them clarified during office hours or recitation.

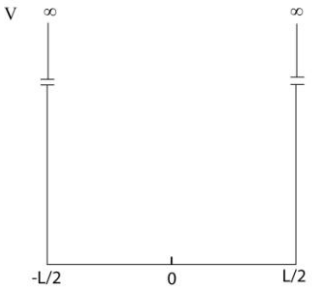
The homework is due Tuesday February 3rd.

1. Problems 4.5, 4.13, 4.16, 4.21, 4.25 [50 points]

2. Consider a particle of mass m in box of length L. The potential energy diagram is sketched on the right. Note that the potential is given by:
$V(x) = \infty$ for $x \geq L/2$, $x \leq -L/2$ and
$V(x) = 0$ for $-L/2 < x < L/2$
The general solution of Schrodinger's Equation for a particle in a box is:

$$\Psi(x) = A\sin(kx) + B\cos(kx) \quad - \quad [1]$$

Using Equation 1, determine the wavefunction of the particle trapped in this box with a potential shown on the right. Normalization of final wavefunction is not required [30 points]



(4) For a particle in a Finite Depth Box (Chapter 5, Section 5.1) show that the wavefunction(s) given by Eq. 5.4 are the correct general solution to the Schrodinger's Equation. [10 points]

(5) Sketch the wavefunctions that are appropriate for a particle in this potential energy surface if the energy of the particle is E_a, E_b, and E_c, respectively. Clearly show relative features (in each region). [10 points]