1) BD 5.1
2) BD 5.2
3) BD 5.3
4) BD 5.4
5) We have used the argument that an integer number of half-wavelengths fits within the classically allowed region of the potential in order to estimate the energy levels for the particle in a finite box. How might you generalize this principle to a spatially varying potential? (Hint: think $k(x)$, not $\lambda(x)$.) Use this idea to estimate the energy levels for Rb atoms moving the potential $V(x) = b|x|$ with $b=14$ mK/cm.
6) Numerically calculate the lowest 5 energy levels in this potential and compare to your predictions from 5).
7) An atom has states $\{g1, e, g2\}$ with energies $\{0, \Delta, 0\}$. Two light waves of the same frequency are shown upon the atom. The interaction with the light is given by $V = \begin{pmatrix} 0 & \varepsilon & 0 \\ \varepsilon^* & 0 & \varepsilon \\ 0 & \varepsilon^* & 0 \end{pmatrix}$. Find the eigenvalues and eigenvectors of $H$. One the three eigenstates is called a “dark” state. Which one is it, and why?