Physics 487 Homework 3: Due Feb. 17, 2015

1.) Griffiths, 5.18, 5.20, 5.25, 5.29, 5.33, 5.37

2.) Consider the tight-binding model we derived in class. For a Hamiltonian with matrix elements of the form,

$$\langle n|H|n\rangle = 0 \tag{1}$$

$$\langle n|H|n \pm 1\rangle = -t_1 \tag{2}$$

$$\langle n|H|n \pm 2\rangle = -t_2. \tag{3}$$

All other other matrix elements are zero. Diagonalize this Hamiltonian and find the energy as a function of the wavevector k. Plot the band as a function of k.