6.728 Applied Quantum and Statistical Physics

Department of Electrical Engineering and Computer Science
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PROBLEM SET 7

<u>Issued:</u> 10-25-02   <u>Due:</u> 10-30-02, in-class

Problem 7.1

Do problem 17.2 of Chapter 17 of the 6.728 Class Notes.

Problem 7.2

Consider the contruction of a two-level model for an asymetric potential well

$$\psi(x,t) = c_0(t)\phi_0(x) + c_1(t)\phi_1(x)$$

In this case the expectation value of position for the different eigenfunctions will not be zero. You are given:

$$X_{00} = \langle \phi_0 | x | \phi_0 \rangle$$
$$X_{01} = \langle \phi_0 | x | \phi_1 \rangle = \langle \phi_1 | x | \phi_0 \rangle$$
$$X_{11} = \langle \phi_1 | x | \phi_1 \rangle$$

(a) Define E_+ and E_- in terms of X_{00}; X_{01}; and X_{11}

(b) Define c_0 and c_1 in terms of X_{00}; X_{01}; and X_{11}

(c) Do the same for $\langle x \rangle$ and $\dfrac{d}{dt}\langle x \rangle$