

Physics 115C Eighth Problem Set

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Office Hours W 10-noon

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1. Exercise 15.2.2, page 413 of the text: if you lost points on Problem Set 6, you can turn in additional work.
2. Consider the Hamiltonian in a 3-state system

$$H = \begin{bmatrix} A & 0 & a \\ 0 & A & b \\ a^* & b^* & B \end{bmatrix}$$

- (a) Find the exact eigenvalues. Then assume $B - A \gg |a|^2, |b|^2$, and expand the eigenvalues to lowest order.
 - (b) Consider the part of the matrix involving a, a^*, b and b^* a perturbation on the diagonal matrix. Find the eigenvalues to second order in perturbation theory. How do they compare with the expansion obtained from the exact results?
3. Exercise 17.3.4, pp. 470-471 of the text.