Homework Assignment 3
Physics 212

Handed out: Monday, February 7, 1999
Due in class on: Thursday, February 11, 1999

Problem 1: Problems in French and Taylor

1. Problem 10-14 on page 469.
2. Problem 10-17 on page 470. In part (e), do show in your homework that the kinetic-energy term commutes with the L_z operator. You don't have to answer part (f).

Problem 2: Problems in Griffiths

1. Problem 4.19 on page 149.
2. Problem 4.28 on page 159.
3. Problem 4.30 on page 159.
4. Problem 4.32 on page 160. You should begin by generalizing Eqs. [4.140] and [4.141] on page 156 to a three-state system:

$$\chi_+ = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \qquad \chi_0 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}, \qquad \chi_- = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}. \tag{1}$$

   Recall also that if $\mathbf{M}$ is a $N \times N$ matrix and $\mathbf{e}_i$ is the ith N-dimensional unit vector (all components zero except the ith component which is 1) then the ith column of $\mathbf{M}$ is given by $\mathbf{M}\mathbf{e}_i$.

Problem 3: Time for Completion

Please tell me the approximate time in hours that it took to finish this assignment.