1) Introduction to Quantum Mechanics 2nd ed., Griffiths Chapter 6
   • 6.1
   • 6.4
   • 6.7

2) A plane rigid rotator having a moment of Inertia $I$ and an electric dipole moment $\vec{d}$ is placed in a homogeneous electric field $\vec{E}$. By considering the electric field as a perturbation, determine the first non-vanishing correction to the energy levels of the rotator.

Recall from assignment 11 problem 2 that the energy levels and normalized wave function for the rigid rotator are

$$E_m^{(0)} = \frac{\hbar^2 m^2}{2I}, \quad \psi_m^{(0)}(\phi) = \frac{1}{\sqrt{2\pi}} e^{im\phi}, \quad m = 0, \pm 1, \pm 2, \ldots,$$