

1. *Coherent States*

Griffiths 3rd ed. problem 3.42. This analyzes a very interesting family of states of the 1D harmonic oscillator, which behave as if the ground state had started to move, with the whole Gaussian sloshing back and forth.

Hint: The idea here is to avoid doing any integrals. You get to use everything we derived in class about the harmonic oscillator and its energy eigenstates. In particular, you will want to make liberal use of the properties of the raising and lowering operators for the harmonic oscillator.

(Picky aside: the name “coherent state” for this is a bit unfortunate. I would prefer to define “coherent” in opposition to “decoherent,” as the property that no quantum information is lost to an environment.)

2. *Addition of Angular Momentum*

Griffiths 3rd ed. problems 4.37 and 4.38