Homework 6 (Due Wednesday 2 March 2005)

1. Show that the 2 by 2 matrix \( U = e^{-iHt/\hbar} \), where \( H = h_1\sigma_1 + h_2\sigma_2 + h_3\sigma_3 \), is unitary: \( U^\dagger U = 1 \).

2. Interpret \( U \) in Prob. 1 in terms of rotation.

3. Reinterpret this result in terms of a spinning particle with a magnetic moment (along the spin axis) which precesses in a magnetic field.