Recitation #4
Quantum 521

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1. Prove that if an operater is skew hermitian $A^\dagger = -A$ that it can have only one real eigenvalue.

2. In the notation from class, for hermitian opertators A,B defining $A' \equiv A - \langle A \rangle$ and similarly for B' show that if $A'|\psi\rangle = cB'|\psi\rangle$ and the anticommutator $\{A, B\} = 0$ that

   $\Delta A \Delta B = |\langle [A, B] \rangle|/2$

   (minimum incertainty product). What kind of constant is c?

   For the Gaussian plane wave state with momentum $\hbar k$ find the constant c.

$$\Psi(\mathrm{x}) = \alpha \mathrm{exp}\{\mathrm{ikx} - \frac{\mathrm{x}^2}{4\sigma^2}\}$$

   where α is the normalization consant.