Homework for Advanced Quantum Mechanics. No. 3

Please send the pdf file to my email: zhaoruitong1986@163.com.

Deadline 2016-10-26 before class.

1. Give the brief description of quantum state and operator in Hilbert space.

2. $|a\rangle = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix}, |b\rangle = \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}, |c\rangle = \begin{pmatrix} c_1 \\ c_2 \end{pmatrix}$. Prove:

(1) $(\langle a| + \langle b|)|c\rangle = \langle a|c\rangle + \langle b|c\rangle$

(2) $(|a\rangle + |b\rangle)\langle c| = |a\rangle\langle c| + |b\rangle\langle c|$

3. Consider the matrices $A = \begin{pmatrix} 0 & 0 & i \\ 0 & 1 & 0 \\ -i & 0 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & i & 0 \\ 3 & 1 & 5 \\ 0 & -i & 2 \end{pmatrix}$. Check if A and B are Hermitian.