

The Answer of Assignment 2

WEI SHUANG

31/8/2025

Problem 1 Solution

- (1) 根据线性空间的同构理论，任何维数相同的线性空间都是同构的。因此可知 $\sum_{i,j=0}^1 c_{ij} |i, j\rangle$ 与 $\{(x_1, x_2, x_3, x_4)\}, x \in C$ 同构。即 $v_1 = (c_{00}, c_{01}, c_{02}, c_{03})^*, v_2 = (d_{00}, d_{01}, d_{10}, d_{11})^*$
- (2) $\langle \psi_1 | \psi_2 \rangle = v_1^\dagger v_2$ 成立, 这是因为
- (3)
- (4)

Problem 2 Solution

- (1)
- (2)
- (3)
- (4)

Problem 3 Solution

- (1)
- (2)
- (3)
- (4) how should the Pauli operators σ_i^+ and σ_i^z be written in terms of the operators?