PHY 6645 - Quantum Mechanics I - Fall 2018
Homework set # 2, due September 5

1. Problems 1.9.1, 1.9.2, 1.9.3, 1.10.1, 1.10.2, 1.10.3 and 1.10.4 in Shankar's book.

2. Show that

$$e^{\Omega} \equiv \sum_{p=0}^{\infty} \frac{1}{p!} \Omega^p = \lim_{n \to \infty} \left(1 + \frac{1}{n} \Omega\right)^n \tag{0.1}$$

where Ω is a linear operator.

3. Show that if U is a linear operator on a vector space $\mathcal{V}$ and if for all vectors $V \in \mathcal{V}$

$$< V'|V' > = < V|V > \tag{0.2}$$

where $|V' > = U|V >$, then U must be a unitary operator on $\mathcal{V}$.