Spring 2002
PHYS/EEE 532 Homework Set 2
Due: 8 March 2002

1. Show that an arbitrary 2 by 2 unitary matrix

$$U = \begin{bmatrix} a & c \\ b & d \end{bmatrix}$$

can be written in the form

$$U = \begin{bmatrix} e^{i(\alpha-\beta/2-\delta/2)}\cos(\gamma/2) & -e^{i(\alpha-\beta/2+\delta/2)}sin(\gamma/2) \\ e^{i(\alpha+\beta/2-\delta/2)}\sin(\gamma/2) & e^{i(\alpha+\beta/2+\delta/2)}\cos(\gamma/2) \end{bmatrix}$$

Relate the parameters α, β, δ, γ to a, b, c, d.

2. Exercise 4.25 in Nielsen & Chuang.

3. Exercise 4.28 N&C.

4. Exercise 4.37 N&C.

5. Exercise 4.39 N&C.