January 22, 2009

PHY 745 – Problem Set #3

This homework is due Monday, January 26, 2009.

Continue reading Chapter 3 in **Tinkham**.

1. Consider the following 2×2 "normal" matrix ($NN^\dagger = N^\dagger N$) in terms of real constants a, b, β, and γ.

$$N = \begin{pmatrix} a & be^{i\beta} \\ be^{i\gamma} & a \end{pmatrix}.$$

   (a) Find the eigenvalues λ_i and eigenvectors v_i

$$Nv_i = \lambda_i v_i.$$

   (b) Show that

$$N^\dagger v_i = \lambda_i^* v_i.$$

   (c) Find the relationships between the constants for the case that N is Hermitian.

   (d) Find the relationships between the constants for the case that N is unitary.