Solutions of HW5

1.

a) $H = \begin{pmatrix} A & B \\ C & D \end{pmatrix}$.

$$\gamma_5 H + H\gamma_5 = \begin{pmatrix} A & B \\ -C & -D \end{pmatrix} + \begin{pmatrix} A & -B \\ C & -D \end{pmatrix} = 0$$

$$\Rightarrow \quad A = 0 \quad B = 0$$

if $\cancel{\gamma_5}$ $H\phi = \lambda\phi \quad \lambda \neq 0 \quad (\phi, \phi) = 1$

then $\quad H\gamma_5\phi = - \quad , -\gamma_5 H\phi$

$$= -\lambda\gamma_5\phi$$

$\Rightarrow$ $\gamma_5\phi$ is eigenvector with eigenvalue $-\lambda$

$$(\gamma_5\phi, \gamma_5\phi) = (\phi, \phi) = 1$$

so it can be normalized

when $\lambda = 0$ we have that $\gamma_5\phi \sim \phi$

so it is not a new eigenvector

SOLUTIONS OF HW5

2. a) $\det A = 2$

b) $\text{Adjg } A = \begin{pmatrix} 5 & -3 & 1 \\ -3 & 3 & -1 \\ 1 & -1 & 1 \end{pmatrix}$

c) $A^{-1} = \frac{1}{2} \text{Adj}(A)$

3. You have to do this yourself using Mathematica