MEEG 4703 Quiz #4

1. (10 points) Find the eigenvalues and eigenvectors of the matrix **A** shown.

$$\mathbf{A} = \begin{bmatrix} 5 & -1 & 0 \\ 0 & -5 & -9 \\ -5 & 1 & 0 \end{bmatrix} \qquad \mathbf{B} = \begin{bmatrix} 2 & 4 \\ -1 & -3 \end{bmatrix}$$

2. (10 points) Using Cayley-Hamilton theorem, compute $\mathbf{B}^{10}$ for the matrix **B** shown.

Answers:

1. $\lambda_1 = 0, \quad \lambda_2 = 4, \quad \lambda_3 = -4$

$$\mathbf{K}_1 = \begin{bmatrix} 9 \\ 45 \\ -25 \end{bmatrix}, \quad \mathbf{K}_2 = \begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix}, \quad \mathbf{K}_3 = \begin{bmatrix} 1 \\ 9 \\ -1 \end{bmatrix}$$

2. $\lambda_1 = 1, \quad \lambda_2 = -2$

$$\mathbf{B}^{10} = \begin{bmatrix} -340 & -1364 \\ 341 & 1365 \end{bmatrix}$$