Linear algebra, WNE, 2018/2019
meeting 18.

4 December 2018

Problems

1. For the following endomorphism $\varphi\colon V \to V$ check whether there exists a basis $\mathcal{A}$ of V which consists of eigenvectors of φ. If so, find $M(\varphi)_{\mathcal{A}}^{\mathcal{A}}$.
$$V = \mathbb{R}^2, \varphi((a,b)) = (a-b, a+3b)$$

2. Check whether matrices $A_1 = \begin{bmatrix} 1 & 1 \\ -1 & 3 \end{bmatrix}, A_2 = \begin{bmatrix} 5 & -3 \\ 3 & -1 \end{bmatrix}$ are diagonalizable. If so, find matrices C_i such that $C_i^{-1} A_i C_i$ is diagonal for $i = 1, 2$.

3. Check whether the following matrix A are diagonalizable. If so, find a matrix C such that $C^{-1}AC$ is diagonal.
$$\begin{bmatrix} 1 & 2 & 0 \\ 2 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix} \begin{bmatrix} 0 & 1 & 0 \\ -4 & 4 & 0 \\ -2 & 1 & 2 \end{bmatrix}$$

4. For the following matrix A calculate A^{2019}.
$$\begin{bmatrix} 1 & -8 \\ 1 & 7 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix}$$

Homework

Group 8:00

1. Check whether the following matrix A is diagonalizable. If so, find a matrix C such that $C^{-1}AC$ is diagonal.
$$\begin{bmatrix} -6 & 2 & 2 \\ 0 & 2 & 4 \\ 0 & 4 & -4 \end{bmatrix}, \begin{bmatrix} 2 & 1 & 3 \\ 1 & 2 & 4 \\ 0 & 0 & 2 \end{bmatrix}$$

2. Calculate $\begin{bmatrix} 0 & 0 & 6 \\ 1 & 0 & -11 \\ 0 & 1 & 6 \end{bmatrix}^{2019}$.

Group 9:45

1. Check whether the following matrix A is diagonalizable. If so, find a matrix C such that $C^{-1}AC$ is diagonal.
$$\begin{bmatrix} -3 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 2 & -2 \end{bmatrix}, \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & 0 \\ 3 & 4 & 2 \end{bmatrix}$$

2. Calculate $\begin{bmatrix} 0 & 0 & -6 \\ -1 & 0 & 11 \\ 0 & -1 & -6 \end{bmatrix}^{2019}$.