

Linear algebra 2: Homework set 2

Due date: October 11 13:45

(H2.1). Suppose that f is an endomorphism of an n -dimensional vector space V with n distinct eigenvalues. Show that V has exactly 2^n subspaces that are f -invariant.

(H2.2). Let V be a 3-dimensional vector space over \mathbb{R} and let $f: V \rightarrow V$ be a nilpotent endomorphism of V . Show that V has infinitely many f -invariant subspaces if and only if $f^2 = 0$.

(H2.3). Give the Jordan normal form of the matrix

$$\begin{pmatrix} 2 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{pmatrix}$$

(H2.4). For the matrix $A = \begin{pmatrix} 3 & 1 \\ -1 & 1 \end{pmatrix}$ compute the matrix e^A .