

MATH 700
HOMEWORK 11

Due Friday, November 15, 1991 at the beginning of class.

(15 points) Let $T: \mathbb{R}^5 \rightarrow \mathbb{R}^5$ be the linear transformation given by $T(x) = Ax$ for each column vector $x \in \mathbb{R}^5$, where A is the matrix

$$A = \begin{bmatrix} 4 & -4 & 8 & -16 & 32 \\ 1 & 0 & 4 & -8 & 16 \\ 0 & 0 & 4 & -4 & 8 \\ 0 & 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}.$$

Find T -cyclic subspaces V_1, \dots, V_m of \mathbb{R}^5 such that $\mathbb{R}^5 = V_1 \oplus \dots \oplus V_m$. Prove your answer is correct.