

1.8 Introduction to Linear Transformations

In this section 1.8 we are interested in mapping T which is defined by a given matrix A . Let A be an $m \times n$ matrix we define $T(x)$ by $T(x) = Ax$.

1.8 p68

Given

$$A = \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 7 \end{bmatrix}, u = \begin{bmatrix} 2 \\ -1 \end{bmatrix}, b = \begin{bmatrix} 3 \\ 2 \\ -5 \end{bmatrix}, c = \begin{bmatrix} 3 \\ 2 \\ 5 \end{bmatrix}$$

$$\begin{array}{l} \mathbb{R}^n \rightarrow \mathbb{R}^m \\ \mathbb{R}^2 \rightarrow \mathbb{R}^3 \\ u \quad b, c \end{array}$$

A) Find $T(u) = Au$

B) Find $x \in \mathbb{R}^2$ whose image under T is B .

$$Ax = b, \text{ solve for } x$$

C) Is there more than one x whose image under T is b ?