

Matrix Theory Assignment 8

Ritesh Kumar
EE20RESCH11005

Abstract—This problem demonstrate a method to find weather given transformation is linear or not.

All the codes for the figure in this document can be found at

https://github.com/Ritesh622/Assignment_EE5609/tree/master/Assignment_8

1 PROBLEM

Find weather given functions \mathbf{T} from \mathbb{R}^2 into \mathbb{R}^2 are linear transformations or not

$$\mathbf{T}(x_1, x_2) = (x_1^2, x_2) \quad (1.0.1)$$

2 SOLUTION

If \mathbf{T} were a linear transformation then we would have

$$\mathbf{T}((1, 0)) = (1, 0) \quad (2.0.1)$$

$$\implies T(-1(1, 0)) = -1.\mathbf{T}(1, 0) \quad (2.0.2)$$

$$\implies -1.(1, 0) = (-1, 0) \quad (2.0.3)$$

which is a contradiction, since

$$(1, 0) \neq (-1, 0). \quad (2.0.4)$$

Hence non-linear transformation.