Assignment-13

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***Abstract*—This assignment deals with linear transformation.**

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https://github.com/satyam463/Assignment−13/blob/main/Assignment%2013.tex

1 Problem Statement

Describe explicitly a linear transformation from R^3 into R^3 which has as its range the subspace spanned by $\begin{pmatrix}1 & 0 & -1\end{pmatrix}$ and $\begin{pmatrix}1 & 2 & 2\end{pmatrix}$.

2 Solution

Transformation T from R^3 to R^3 range gives the column space and kernel (null space) is $T(\mathbf{x})$=0

$$\mathbf{Ax} = 0 \implies \begin{pmatrix}1 & 1\\ 0 & 2\\ -1 & 2\end{pmatrix}\mathbf{x} = 0 \tag{2.0.1}$$

Hence,

$$T(\mathbf{x}) = \mathbf{Ax} \tag{2.0.2}$$

$$T(\mathbf{x}) = \begin{pmatrix}1 & 1\\ 0 & 2\\ -1 & 2\end{pmatrix}\mathbf{x} \tag{2.0.3}$$