Matrix theory Assignment 2

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***Abstract*—This document contains the solution of a matrix multiplication problem.**

1 Problem

1.1. For what value of x:

$$\begin{pmatrix}1 & 2 & 1\end{pmatrix}\begin{pmatrix}1 & 2 & 0\\ 2 & 0 & 1\\ 1 & 0 & 2\end{pmatrix}\begin{pmatrix}0\\ 2\\ x\end{pmatrix} = 0 \tag{1.1.1}$$

2 Solution

2.2. Below is the solution :

$$\begin{pmatrix}1 & 2 & 1\end{pmatrix}\begin{pmatrix}1 & 2 & 0\\ 2 & 0 & 1\\ 1 & 0 & 2\end{pmatrix}\begin{pmatrix}0\\ 2\\ x\end{pmatrix} = 0 \tag{2.2.1}$$

$$\implies \begin{pmatrix}1\times1+2\times2+1\times1 & 1\times2+2\times0+1\times0 & 1\times0+2\times1+1\times2\end{pmatrix}\begin{pmatrix}0\\ 2\\ x\end{pmatrix} = 0 \tag{2.2.2}$$

$$\implies \begin{pmatrix}6 & 2 & 4\end{pmatrix}\begin{pmatrix}0\\ 2\\ x\end{pmatrix} = 0 \tag{2.2.3}$$

$$\implies 6\times0+2\times2+4\times x = 0 \tag{2.2.4}$$

$$\implies 4+4\times x = 0 \tag{2.2.5}$$

$$\implies 4\times x = -4 \tag{2.2.6}$$

$$\implies x = -1 \tag{2.2.7}$$