Assignment - 12.10.4.4

Surajit Sarkar

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

CONTENTS

I. PROBLEM

Show that $\left(\mathbf{a}-\mathbf{b}\right)\left(\mathbf{a}+\mathbf{b}\right)=2\left(\mathbf{a}\times\mathbf{b}\right)$

II. SOLUTION

Consider

$$\mathbf{a}=\begin{pmatrix}1\\1\end{pmatrix},\mathbf{b}=\begin{pmatrix}2\\1\end{pmatrix} \tag{1}$$

$$\left(\mathbf{a}-\mathbf{b}\right)\left(\mathbf{a}+\mathbf{b}\right)=2\left(\mathbf{a}\times\mathbf{b}\right) \tag{2}$$

where

$$\left(\mathbf{a}-\mathbf{b}\right)=\begin{pmatrix}-1\\0\end{pmatrix} \tag{3}$$

$$\left(\mathbf{a}+\mathbf{b}\right)=\begin{pmatrix}3\\2\end{pmatrix} \tag{4}$$

$$\left(\begin{pmatrix}-1\\0\end{pmatrix}\begin{pmatrix}3\\2\end{pmatrix}\right)=2\left(\begin{pmatrix}1\\1\end{pmatrix}\begin{pmatrix}2\\1\end{pmatrix}\right) \tag{5}$$

$$-2\begin{pmatrix}0\\0\\1\end{pmatrix}=-2\begin{pmatrix}0\\0\\1\end{pmatrix} \tag{6}$$

https://github.com/sssurajit/fwc/blob/main/vectors/12.10.4.4/codes/code.py

Execute the code by using the command
python3 code.py