

Assignment 1

Linear Algebra

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1 Problem

Find the area of a rectangle $ABCD$ with vertices $A = \begin{pmatrix} -1 \\ \frac{1}{2} \\ 4 \end{pmatrix}$, $B = \begin{pmatrix} 1 \\ \frac{1}{2} \\ 4 \end{pmatrix}$, $C = \begin{pmatrix} 1 \\ -\frac{1}{2} \\ 4 \end{pmatrix}$, $D = \begin{pmatrix} -1 \\ -\frac{1}{2} \\ 4 \end{pmatrix}$.

2 Solution

The adjacent sides of the rectangle are BA and AD (i.e. length and breadth).
Area of a rectangle = length * breadth = $AD \cdot AB$.

$$AD = \begin{vmatrix} A & D \end{vmatrix} = \begin{vmatrix} -1 & 1 \\ \frac{1}{2} & -\frac{1}{2} \\ 4 & 4 \end{vmatrix} = 1$$

Similarly, $BA = \begin{vmatrix} B & A \end{vmatrix} = 2$

Thus, area = $1 \cdot 2 = 2$ sq.units

Python code link

https://github.com/Swati-Mohanty/EE5600/blob/master/Assignment1/Code/quad_area.py