Assignment 3

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Download all python codes from

https://github.com/tanmaygoyal258/EE3900-Linear-Systems-and-Signal-processing/blob/main/Assignment3/code.py

Download all latex codes from

https://github.com/tanmaygoyal258/EE3900-Linear-Systems-and-Signal-processing/blob/main/Assignment3/main.tex

1 Problem

(Construction/Q.2.6) Construct rhombus *BEND* such that $BN = 5.6$ and $DE = 6.5$

2 Solution

Let $\mathbf{O} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ be the intersection point of the diagonals of the rhombus.

Since the diagonals of a rhombus bisect one another, we have:

$$\|\mathbf{BO}\| = \|\mathbf{NO}\| = \frac{5.6}{2} = 2.8 \tag{2.0.1}$$

$$\|\mathbf{EO}\| = \|\mathbf{DO}\| = \frac{6.5}{2} = 3.25 \tag{2.0.2}$$

Now, since $\mathbf{O} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$:

$$\|\mathbf{BO}\| = \|\mathbf{B}\| = 2.8 \tag{2.0.3}$$

$$\|\mathbf{NO}\| = \|\mathbf{N}\| = 2.8 \tag{2.0.4}$$

$$\|\mathbf{EO}\| = \|\mathbf{D}\| = 3.25 \tag{2.0.5}$$

$$\|\mathbf{EO}\| = \|\mathbf{E}\| = 3.25 \tag{2.0.6}$$

Since the diagonals lie along perpendicular axes with $\mathbf{O}$ as the intersection point, the vertices will also lie on the same perpendicular axes. We can obtain the set of coordinates as:

$$\mathbf{B} = \begin{pmatrix} 2.8 \\ 0 \end{pmatrix} \tag{2.0.7}$$

$$\mathbf{E} = \begin{pmatrix} 0 \\ -3.25 \end{pmatrix} \tag{2.0.8}$$

$$\mathbf{N} = \begin{pmatrix} -2.8 \\ 0 \end{pmatrix} \tag{2.0.9}$$

$$\mathbf{D} = \begin{pmatrix} 0 \\ 3.25 \end{pmatrix} \tag{2.0.10}$$

Plotting the following in Python, we obtain the following:

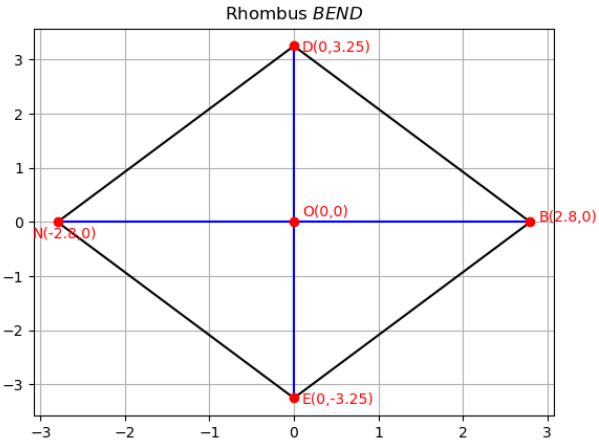

Fig. 0: Rhombus *BEND*