

Assignment 1

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Download all python codes from

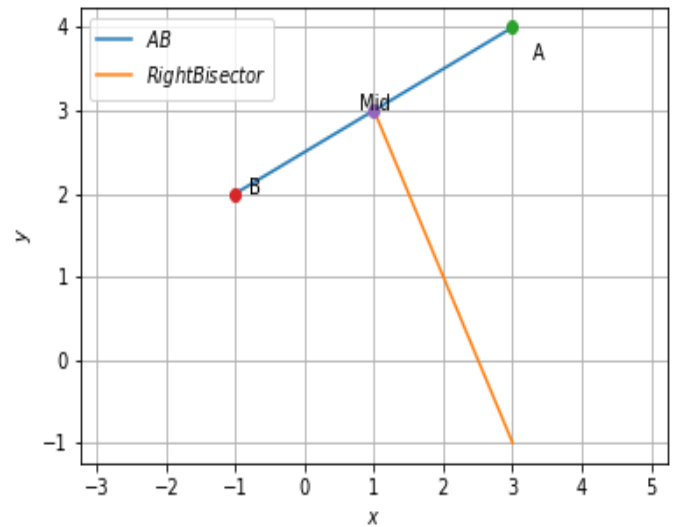
https://github.com/Bharat437/Matrix_Theory/tree/master/Assignment1/Codes

and latex-tikz codes from

https://github.com/Bharat437/Matrix_Theory/tree/master/Assignment1

We got equation of the right bisector of line segment joining points **A** and **B**. The line also passes through point **M**

Plot of Line segment and Right bisector:



1 QUESTION No. 41

Find the equation of the right bisector of the line segment joining the points $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ and $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$

2 EXPLANATION

The right bisector of the line segment joining two points passes through mid-point between two points and it is perpendicular to the line segment.

Let **M** be the midpoint of two points $\mathbf{A} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$.

$$\mathbf{M} = \frac{\mathbf{A} + \mathbf{B}}{2} = \frac{1}{2} \begin{pmatrix} 2 \\ 6 \end{pmatrix} \quad (2.0.1)$$

$$\Rightarrow \mathbf{M} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$$

Using section 3.1.22, Let **x** be an equidistant point from points **A** and **B**. Then we have

$$\left\| \mathbf{x} - \begin{pmatrix} 3 \\ 4 \end{pmatrix} \right\|^2 = \left\| \mathbf{x} - \begin{pmatrix} -1 \\ 2 \end{pmatrix} \right\|^2 \quad (2.0.2)$$

$$\begin{aligned} \Rightarrow \|\mathbf{x}\|^2 + \left\| \begin{pmatrix} 3 \\ 4 \end{pmatrix} \right\|^2 - 2 \begin{pmatrix} 3 & 4 \end{pmatrix} \mathbf{x} \\ = \|\mathbf{x}\|^2 + \left\| \begin{pmatrix} -1 \\ 2 \end{pmatrix} \right\|^2 - 2 \begin{pmatrix} -1 & 2 \end{pmatrix} \mathbf{x} \end{aligned} \quad (2.0.3)$$

$$\begin{pmatrix} 2 & 1 \end{pmatrix} \mathbf{x} = 5 \quad (2.0.4)$$