Assignment Matrix 1

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Find Python Codes from below link

https://github.com/Sekharjala/Matrix/

and latex-tikz codes from

https://github.com/Sekharjala/Matrix/

1 Examples 1

1.1 Question

Find the distance between the following pair of points

$$\mathbf{A} = \begin{pmatrix} b+c \\ c+a \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} c+a \\ a+b \end{pmatrix} \tag{1.1.1}$$

2 Solution

The distance between two vectors is given by

$$\|\mathbf{A}-\mathbf{B}\| \tag{2.0.1}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{\left(\mathbf{A}-\mathbf{B}\right)^{\mathsf{T}}\left(\mathbf{A}-\mathbf{B}\right)} \tag{2.0.2}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{\left(\begin{pmatrix} b+c \\ c+a \end{pmatrix} - \begin{pmatrix} c+a \\ a+b \end{pmatrix}\right)^{\mathsf{T}} \left(\begin{pmatrix} b+c \\ c+a \end{pmatrix} - \begin{pmatrix} c+a \\ a+b \end{pmatrix}\right)} \tag{2.0.3}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{\begin{pmatrix} b-a \\ c-b \end{pmatrix}^{\mathsf{T}} \begin{pmatrix} b-a \\ c-b \end{pmatrix}} \tag{2.0.4}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{\begin{pmatrix} b-a & c-b \end{pmatrix} \begin{pmatrix} b-a \\ c-b \end{pmatrix}} \tag{2.0.5}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{\left((b-a)^2+(c-b)^2\right)} \tag{2.0.6}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{a^2+2b^2+c^2-2ab-2cb} \tag{2.0.7}$$

Let us assume that $\mathbf{A}$ and $\mathbf{B}$ are the vectors having real elements a=0,b=1,c=2 then

$$\mathbf{A} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

$$\mathbf{B} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{1+1}$$

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{2}$$

$$= 1.414$$

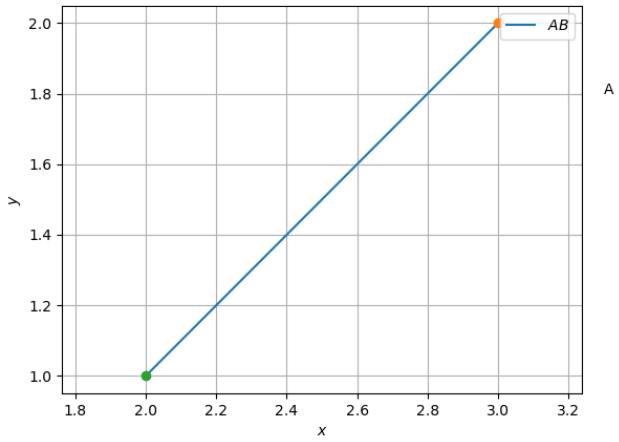

Fig. 0: Line between A and B