EE3900 Assignment - 1

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Download latex-tikz codes from

https://github.com/adhvik24/EE3900/blob/main/Assignment_1/Assignment_1.tex

1 Ramsey 1.1 qn 2(c)

Find the length of PQ for $\vec{P} = \begin{pmatrix} a \\ b \end{pmatrix}$ and $\vec{Q} = \begin{pmatrix} -b \\ a \end{pmatrix}$.

2 SOLUTION

Two point are P and Q. Let the distance between both points is d.

$$\vec{Z} = \vec{P} - \vec{Q} \tag{2.0.1}$$

Then the distance between P and Q is given by:

$$d = \|\vec{Z}\| \tag{2.0.2}$$

$$d = \|\vec{P} - \vec{Q}\| \tag{2.0.3}$$

And P-Q is,

$$Z = P - Q = \begin{pmatrix} a \\ b \end{pmatrix} - \begin{pmatrix} -b \\ a \end{pmatrix} \tag{2.0.4}$$

$$\implies Z = \begin{pmatrix} a+b \\ b-a \end{pmatrix} \tag{2.0.5}$$

So, the distance between given points P and Q is:

$$d = \sqrt{(a-(-b))^2 + (b-a)^2} \tag{2.0.6}$$

$$d = \sqrt{(a+b)^2 + (b-a)^2} \tag{2.0.7}$$

$$d = \sqrt{2(a^2+b^2)} \tag{2.0.8}$$

$\therefore$ The length of PQ is $\sqrt{2(a^2+b^2)}$.