Assignment 1
Probability And Random Processes

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I. QUESTION 1.4.4

Verify that

$$OA = OB = OC$$

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Solution: Given,

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} -3 \\ -5 \end{pmatrix}$$

Also, we find $\mathbf{C} = \begin{pmatrix} \frac{-53}{12} \\ \frac{5}{12} \end{pmatrix}$ as point of intersection of perpendicular bisectors of AB and AC.
Finding norm of $\mathbf{OA}, \mathbf{OB}, \mathbf{OC}$:

$$\|\mathbf{OA}\| = \sqrt{(1 - (-53/12))^2 + (-1 - 5/12)^2} \quad (1)$$
$$= 5.59 \quad (2)$$
$$\|\mathbf{OB}\| = \sqrt{(-4 - (-53/12))^2 + (6 - 5/12)^2} \quad (3)$$
$$= 5.59 \quad (4)$$
$$\|\mathbf{OC}\| = \sqrt{(-3 - (-53/12))^2 + (-5 - 5/12)^2} \quad (5)$$
$$= 5.59 \quad (6)$$

From eq(2), eq(4) and eq(6), we found OA = OB =OC