

IIT HYDERABAD

INTRODUCTION TO AI AND ML

ASSIGNMENT

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1 PROBLEM

The line joining the points (-6,8) and (8,-6) is divided into four equal parts; Find the coordinates of the points of section.

2 SOLUTION

We will be using matrix approach for calculating the coordinates of the points of section which is divided into four equal parts.

$$\begin{bmatrix} x_1 \\ y_1 \end{bmatrix} = \frac{1}{4} \begin{bmatrix} -6 & 8 \\ 8 & -6 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \end{bmatrix} = \begin{bmatrix} -10/4 \\ 18/4 \end{bmatrix} = \begin{bmatrix} -5/2 \\ 9/2 \end{bmatrix}$$

Points x_1, y_1 divides line in ratio 3:1

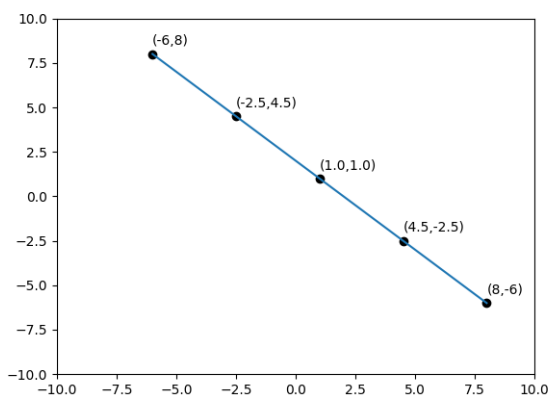
$$\begin{bmatrix} x_2 \\ y_2 \end{bmatrix} = \frac{1}{2} \begin{bmatrix} -6 & 8 \\ 8 & -6 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 2/2 \\ 2/2 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

Points x_2, y_2 divides lines in ratio 1:1

$$\begin{bmatrix} x_3 \\ y_3 \end{bmatrix} = \frac{1}{4} \begin{bmatrix} -6 & 8 \\ 8 & -6 \end{bmatrix} \begin{bmatrix} 1 \\ 3 \end{bmatrix} = \begin{bmatrix} 18/4 \\ -10/4 \end{bmatrix} = \begin{bmatrix} 9/2 \\ -5/2 \end{bmatrix}$$

Points x_3, y_3 divides lines in ratio 1:3

3 PLOT OBTAINED FROM PYTHON CODE



4 CONCLUSION

The points $(\vec{x_1}\vec{y_1}), (\vec{x_2}\vec{y_2}), (\vec{x_3}\vec{y_3})$ divides the lines into four parts in ratio (3:1) (1:1) (1:3). The points $(\vec{x_1}\vec{y_1}) = (-2.5, 4.5), (\vec{x_2}\vec{y_2}) = (1, 1), (\vec{x_3}\vec{y_3}) = (4.5, -2.5)$

<https://www.overleaf.com/project/6128ee907ed3661ebeed4bc8>