

Assignment 1

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vector

Abstract—This document contains the solution to find Internally and externally divided coordinate points.

Download all python codes from

<https://github.com/Anjalibagade/EE5600/tree/master/Assignment1>

and latex codes from

<https://github.com/Anjalibagade/EE5600/Assignment1>

Problem

Vector-2 Example 1,18

Find the coordinates of the point which divides, internally and externally, the line joining $(-3, -4)$ to $(-8, 7)$ in the ratio $7:5$

Solution:

Let us consider P is a point which divides A and B in the ratio of $7:5$ gives internally divided point.

• Finding internal coordinate point :

The coordinates of point S which divides the line joining points A and B internally in the ratio $m:n$ is given by the section formula

$$S = \left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right) \quad (0.0.1)$$

Substitute all the values in the equation given above

$$\Rightarrow \left(\frac{7(-8) + 5(-3)}{7+5}, \frac{7(7) + 5(-4)}{7+5} \right) \quad (0.0.2)$$

$$\Rightarrow \left(\frac{-56-15}{12}, \frac{49-20}{12} \right) \quad (0.0.3)$$

$$\Rightarrow \left(\frac{-71}{12}, \frac{29}{12} \right) \quad (0.0.4)$$

Hence internal division is taking place at point

$$S = \left(\frac{-71}{12}, \frac{29}{12} \right) \quad (0.0.5)$$

Similarly,

• Finding external coordinate point :

The coordinates of point T which divides the line joining points A and B externally in the ratio $m:n$ is given by the section formula

$$T = \left(\frac{mx_2 - nx_1}{m-n}, \frac{my_2 - ny_1}{m-n} \right) \quad (0.0.6)$$

Substitute all the values in the equation given above

$$\Rightarrow \left(\frac{7(-8) - 5(-3)}{7-5}, \frac{7(7) - 5(-4)}{7-5} \right) \quad (0.0.7)$$

$$\Rightarrow \left(\frac{-56+15}{2}, \frac{49+20}{2} \right) \quad (0.0.8)$$

$$\Rightarrow \left(\frac{-41}{2}, \frac{69}{2} \right) \quad (0.0.9)$$

Hence external division is taking place at point

$$T = \left(\frac{-41}{2}, \frac{69}{2} \right) \quad (0.0.10)$$

Result

Plot of coordinate of the points obtained from Python code is shown below.

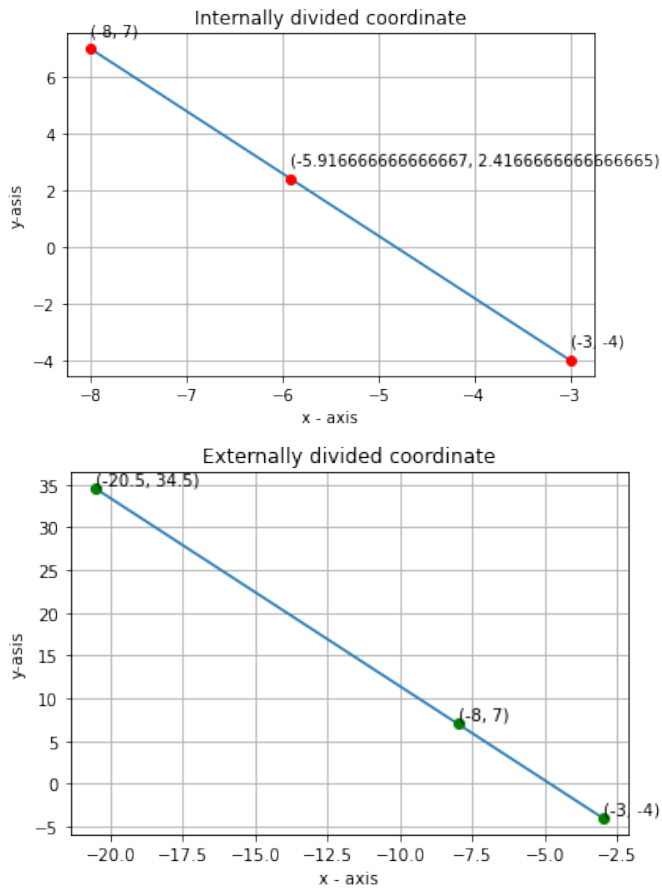


Fig. 0: Plot of coordinate of the point which divides internally and externally