Assignment 1

Anjali Bagade,EE21MTECH11001

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 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 $\mathrm{S}\left(a,b\right)$ which divides the line joining points $\mathrm{A}\left(x_1,y_1\right)$ and $\mathrm{B}\left(x_2,y_2\right)$ internally in the ratio m:n is given by the section formula

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

Substitute all the values in the equation given above

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

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

$$\implies \left(\frac{-71}{12},\frac{29}{12}\right) \tag{0.0.4}$$

Hence internal division is taking place at point

$$\mathbf{S}\left(a,b\right)=\left(\frac{-71}{12},\frac{29}{12}\right) \tag{0.0.5}$$

Similarly,

- **Finding external coordinate point :**

The coordinates of point $\mathrm{T}\left(p,q\right)$ which divides the line joining points $\mathrm{A}\left(x_1,y_1\right)$ and $\mathrm{B}\left(x_2,y_2\right)$ externally in the ratio m:n is given by the section formula

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

Substitute all the values in the equation given above

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

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

$$\implies \left(\frac{-41}{2},\frac{69}{2}\right) \tag{0.0.9}$$

Hence external division is taking place at point

$$\mathbf{T}\left(p,q\right)=\left(\frac{-41}{2},\frac{69}{2}\right) \tag{0.0.10}$$

Result

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

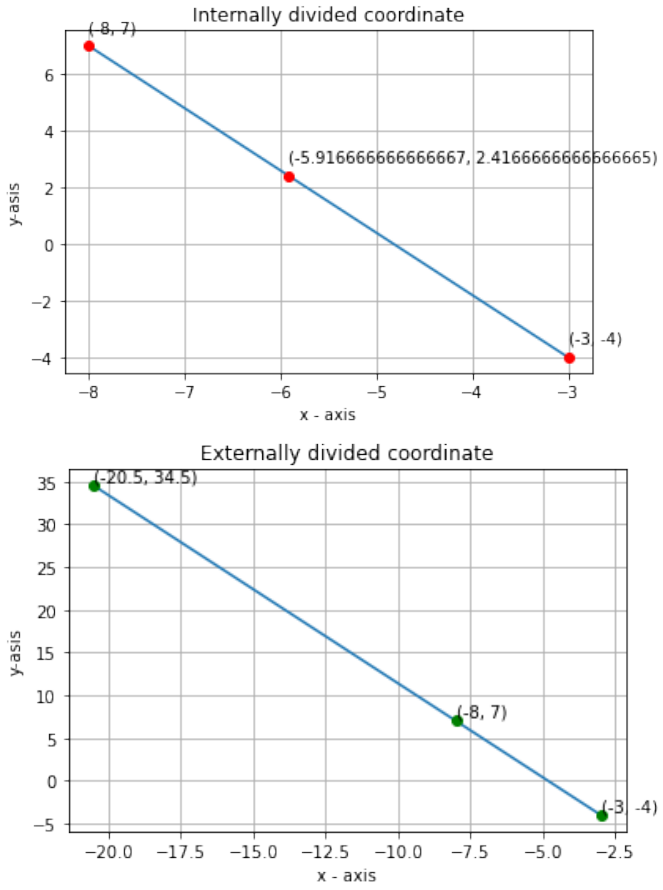

Fig. 0: Plot of coordinate of the point which divides internally and externally