1.4.9.h

EE24BTECH11007 - Arnav Makarand Yadnopavit

Question:
Find the coordinates of the points which trisect the line segment joining the points **P** $(4, 2, -6)$ and **Q** $(10, -16, 6)$.
Solution: Given

Point	Coordinates
P	$(4, 2, -6)$
Q	$(10, -16, 6)$

TABLE 0: Given Values

Let **R** and **S** trisect **P** and **Q**
Using Section Formula

$$\mathbf{R} = \frac{1}{\frac{1}{2} + 1} \left(\frac{1}{2} \begin{pmatrix} 4 \\ 2 \\ -6 \end{pmatrix} + \begin{pmatrix} 10 \\ -16 \\ 6 \end{pmatrix} \right) \tag{0.1}$$

$$\mathbf{R} = \begin{pmatrix} 8 \\ -10 \\ 2 \end{pmatrix} \tag{0.2}$$

$$\mathbf{S} = \frac{1}{\frac{2}{1} + 1} \left(\frac{2}{1} \begin{pmatrix} 4 \\ 2 \\ -6 \end{pmatrix} + \begin{pmatrix} 10 \\ -16 \\ 6 \end{pmatrix} \right) \tag{0.3}$$

$$\mathbf{S} = \begin{pmatrix} 6 \\ -4 \\ -2 \end{pmatrix} \tag{0.4}$$
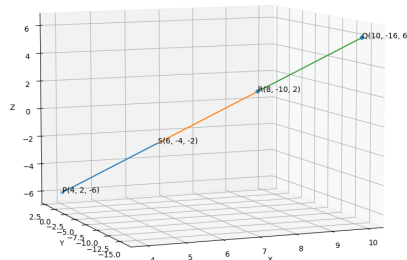
Thus coordinates of **R** and **S** are $(8, -10, 6)$ and $(6, -4, -2)$

Fig. 0.1: Plot of **P,Q,R,S**