1.8.11

AI25BTECH11035 - SUJAL RAJANI

Question:
Find the coordinates of the point **P** on AD such that AP : PD = 2 : 1.
Solution:
As nothing is mentioned in the question about the coordinates of A and D , so we are assuming the coordinates of A as (2,2) ,D as (-1,-1) .

$$\mathbf{A} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}, \mathbf{D} = \begin{pmatrix} -1 \\ -1 \end{pmatrix}. \tag{1}$$

as mentioned in the question **P** is dividing the join of A and D in 2 : 1.
so for finding the position vector of **P** we are using section formula
If **D** divides BC in the ratio k : 1

$$\mathbf{D} = \frac{k\mathbf{C} + \mathbf{B}}{k + 1}$$

k=2
the position vector of **P** is :

$$\mathbf{P} = \frac{2\mathbf{D} + \mathbf{A}}{2 + 1}$$

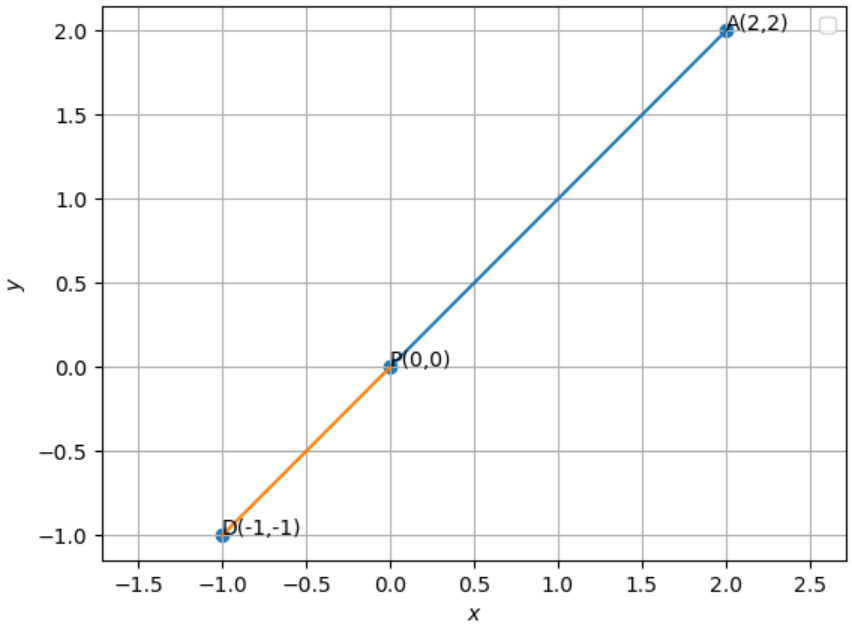
In matrix form:

$$\mathbf{P} = \frac{1}{3} \begin{pmatrix} \mathbf{D} & \mathbf{A} \end{pmatrix} \begin{pmatrix} 2 \\ 1 \end{pmatrix} \tag{2}$$

$$\mathbf{P} = \frac{1}{3} \begin{pmatrix} -1 & 2 \\ -1 & 2 \end{pmatrix} \begin{pmatrix} 2 \\ 1 \end{pmatrix} \tag{3}$$

$$= \frac{1}{3} \begin{pmatrix} 0 \\ 0 \end{pmatrix} \tag{4}$$

$$= \begin{pmatrix} 0 \\ 0 \end{pmatrix} \tag{5}$$


A(2,2)
P(0,0)
D(-1,-1)
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5
y
x