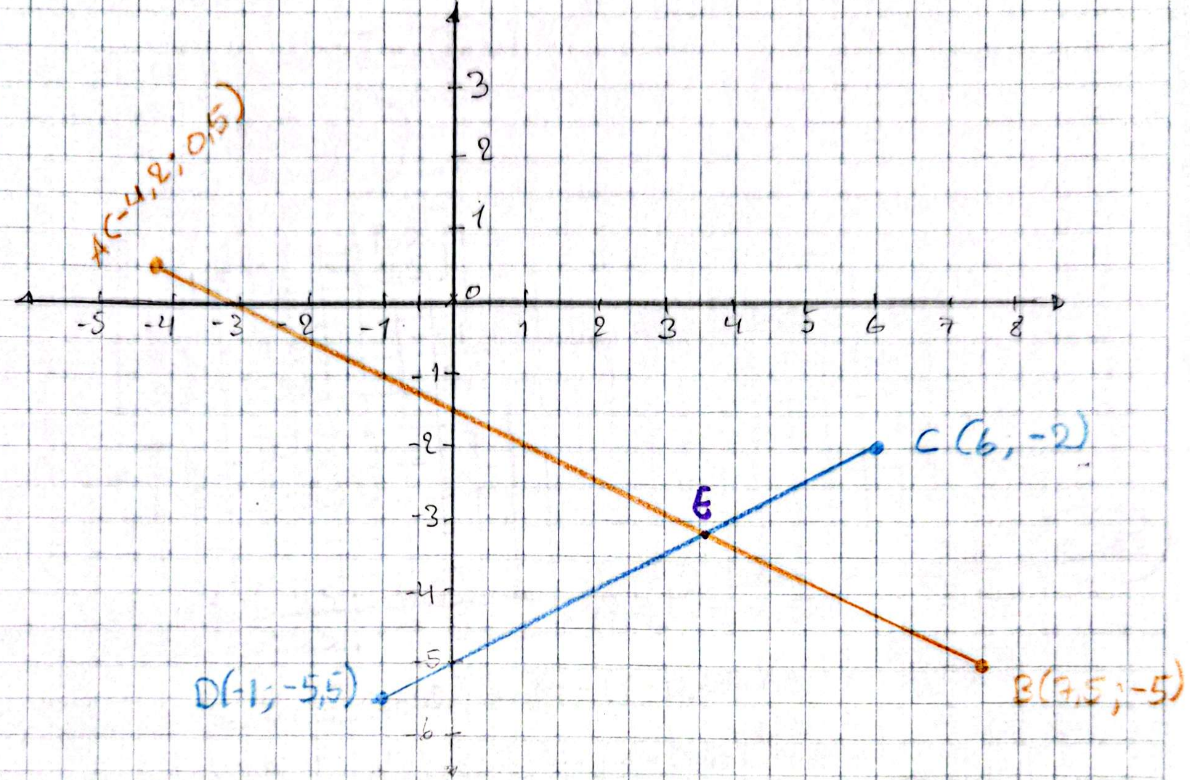
Escuela Politécnica Nacional

Nombre: Fernando Eliceo Huilca Villagomez   Fecha: 05/04/2025

Punto seleccionados:

A: (-4,2 ; 0,5)   B (7,5 ; -5)   C(6 ; -2)   D(-1 ; -5,5)



Representaciones

AB $t \longmapsto tA + (1-t)B$

CD $s \longmapsto sC + (1-s)D$

Representación Implícita

$$A - B = \begin{bmatrix} -4,2 - (7,6) \\ 0,5 - (-5) \end{bmatrix} = \begin{bmatrix} -11,7 \\ 5,5 \end{bmatrix} \rightarrow \vec{n} = (-5,5 ; -11,7)$$

$$F(x,y) = \begin{bmatrix} x - 7,5 \\ y + 5 \end{bmatrix} \begin{bmatrix} -5,5 \\ -11,7 \end{bmatrix} = 0$$

$$F(x,y) = -5,5x + 41,25 - 11,5y - 57,5 = 0 \quad F(x,y) = -5,5x - 11,5y - 16,25 = 0$$

Intersección Paramétrica - Paramétrica

$$t_0 A + (1-t_0)B = S_0 C + (1-S_0)D$$

$$t_0 A + B - t_0 B = S_0 C + D - S_0 D$$

$$B + t_0(A-B) = D + S_0(C-D)$$

$$B - D = S_0(C-D) - t_0(A-B)$$

$\mu = C - D$
$v = A - B$

$$(B-D)\cdot x\vec{v} = (S_0\,\mu)\cdot x\vec{v} - (t_0 v)\cdot x\vec{v}^{\,0}$$

$$S_0 = \frac{(B-D)\,x\vec{v}}{\mu \cdot x\vec{v}}$$

$$B - D = \begin{bmatrix} 7{,}5 & -(-1) \\ -5 & -(-5{,}5) \end{bmatrix} = \begin{bmatrix} 8{,}5 \\ 0{,}5 \end{bmatrix}$$

$$v = A - B = \begin{bmatrix} -4{,}2 & -\ 7{,}5 \\ 0{,}5 & -(-5) \end{bmatrix} = \begin{bmatrix} -11{,}7 \\ 5{,}5 \end{bmatrix} \rightarrow x\vec{v} = (-5{,}5\ ;\ -11{,}7)$$

$$\mu = C - D = \begin{bmatrix} 6 & -\ (-1) \\ -2 & -\ (-5{,}5) \end{bmatrix} = \begin{bmatrix} 7 \\ 3{,}5 \end{bmatrix}$$

$$S_0 = \frac{(8{,}5\ ;\ 0{,}5)\cdot(-5{,}5\ ;\ -11{,}7)}{(7\ ;\ 3{,}5)\cdot(-5{,}5\ ;\ -11{,}7)} = \frac{-46{,}75 + (-5{,}85)}{-38{,}5 + (-40{,}95)} = \frac{-52{,}6}{-79{,}45} = 0.662$$

$$x \rightarrow S_0 C_x + (1-S_0) D_x = 0{,}662(6) + (1-0{,}662)(-1) = 3{,}594$$

$$y \rightarrow S_0 C_y + (1-S_0) D_y = 0{,}662(-2) + (1-0{,}662)(-5{,}5) = -3{,}183$$

Respuesta: El punto de corte tiene las coordenadas $(3{,}594\ ;\ -3{,}183)$

Escaneado con CamScanner

Paramétrica Implícita

Paramétrico: $AB \quad t \mapsto t_0 A + (1 - t_0) B$

Implícita: $C - D = \begin{bmatrix} 6 & -(-1) \\ -2 & -(-5{,}5) \end{bmatrix} = \begin{bmatrix} 7 \\ 3{,}5 \end{bmatrix} \rightarrow \vec{n} = (-3{,}5 \,;\, 7)$

$$f(x,y) = \begin{bmatrix} x & -(-1) \\ y & -(-5{,}5) \end{bmatrix} \cdot \begin{bmatrix} -3{,}5 \\ 7 \end{bmatrix} = 0 \qquad (X - S)\vec{n} = 0$$

$$(X - S)\vec{n} = 0$$

$$((t_0 A + (1 - t_0)B) - S)\vec{n} = 0$$

$$((1 - t_0)B + t_0 A - S)\vec{n} = 0$$

$$(B - Bt_0 + At_0 - S)\vec{n} = 0$$

$$(B + t_0(A - B) - S)\vec{n} = 0$$

$$(t_0(A - B) + (B - S))\vec{n} = 0$$

$u = A - B$
$v = B - S$

$$t_0 u\vec{n} + v\vec{n} = 0$$

$$t_0 = \frac{-v\vec{n}}{u\vec{n}}$$

$$u = A - B = \begin{bmatrix} -4{,}2 & -(7{,}5) \\ 0{,}5 & -(-5) \end{bmatrix} = (-11{,}7 \,;\, 5{,}5)$$

$$v = B - S = \begin{bmatrix} 7{,}5 & -(-1) \\ -5 & -(-5{,}5) \end{bmatrix} = (8{,}5 \,;\, 0{,}5)$$

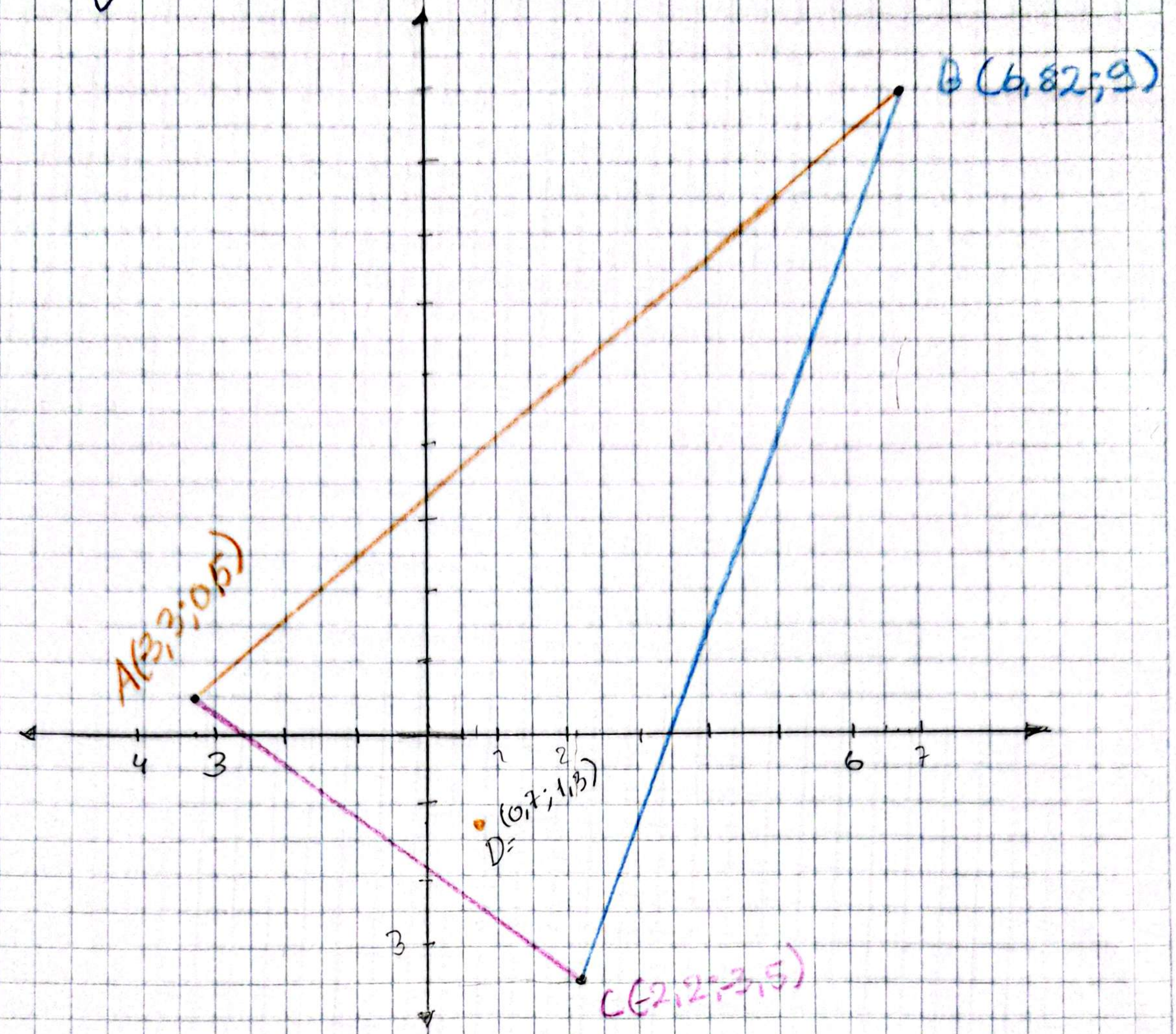
$$t_0 = \frac{-(8{,}5 \,;\, 0{,}5)(-3{,}5 \,;\, 7)}{(-11{,}7 \,;\, 5{,}5)(-3{,}5 \,;\, 7)} = \frac{26{,}25}{79{,}45} = 0{,}3304$$

$$x \rightarrow 0{,}3304(-4{,}2) + (1 - 0{,}3304)(7{,}5) = 3{,}6343$$

$$y \rightarrow 0{,}3304(0{,}5) + (1 - 0{,}3304)(-5) = -3{,}1828$$

Respuesta: Las coordenadas del punto E es igual a $E = (3{,}63 \,;\, -3{,}18)$

Triangulo - Coordenadas Baricentricas



$$D = A + \beta(B - A) + \gamma(C - A)$$

$$\begin{cases} D_x = A_x + \beta(B_x - A_x) + \gamma(C_x - A_x) \\ D_y = A_y + \beta(B_y - A_y) + \gamma(C_y - A_y) \end{cases}$$

$$\begin{cases} 0{,}7 = (3{,}3) + \beta(6{,}82 + 3{,}3) + \gamma(-2{,}2 - (-3{,}3)) \\ 1{,}3 = 0{,}5 + \beta(9 - 0{,}5) + \gamma(-3{,}5 - 0{,}5) \end{cases}$$

$$\begin{cases} 4 = \beta(10{,}12) + \gamma(1{,}1) & \text{mult } 3{,}636 \\ 0{,}8 = \beta(8{,}5) + \gamma(-4) & ① \end{cases}$$

$$14{,}55 = 36{,}8\beta + 4\gamma$$
$$0{,}8 = 8{,}50\beta - 4\gamma$$
$$15{,}35 = 45{,}3$$

$\{\beta = 0{,}366\}$ en ①

$$0{,}8 = (0{,}366)(8{,}5) + \gamma(-4)$$

$\{\gamma = 0{,}272\}$

Para α =

$$\alpha = 1 - \gamma - \beta$$
$$\alpha = 1 - (0{,}272) - (0{,}366)$$

$\{\alpha = 0{,}362\}$

Respuesta.- Las coordenadas barimétricas son D(0,362; 0,366; 0,