АГ 3.12.12

$$e: \begin{cases} x = 3+s \\ y = -1+2s \\ z = 4s \end{cases} \qquad m: \begin{cases} x = -2+3u \\ y = -1 \\ z = 4-5u \end{cases}$$

Точки се:

а) $A(1,1,1)$

б) $\parallel m = \begin{cases} x-3y-z=0 \\ x+y-z+4=0 \end{cases}$

в) $\perp \alpha : x-3y+z-5=0$

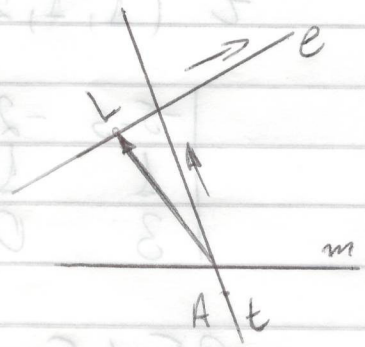
Решение

а) $t: \begin{cases} x = 1+a\lambda \\ y = 1+b\lambda \\ z = 1+c\lambda \end{cases}$ $\quad L(3,-1,0)\ (s=0)$

$\vec{e}(1,2,4)$

$\vec{t}(a,b,c)$

$\overrightarrow{AL}(2,-2,-1)$



Трансверзала

$$\begin{vmatrix} a & b & c \\ 1 & 2 & 4 \\ 2 & -2 & -1 \end{vmatrix} = 0$$

$$-2a+8b-2c-(4c-8a-b)=0$$

$$6a+9b-6c=0$$

$M(-2,-1,4)\ (u=0)$

$\vec{m}(3,0,-5)$; $\overrightarrow{AM}(-3,-2,3)$

$$\begin{vmatrix} a & b & c \\ 3 & 0 & -5 \\ -3 & -2 & 3 \end{vmatrix} = 0$$

$$15b-6c-(10a+9b)=0$$

$$-10a+6b-6c=0$$

$$16a + 3b = 0 \Rightarrow a = -\frac{3}{16}b$$

$$6c = \frac{30}{16}b + 6b = \frac{63}{8}b \Rightarrow c = \frac{21}{16}b$$

$$t: \begin{cases} x = x_0 + w \\ y = y_0 + w \\ z = z_0 + 2w \end{cases} \qquad \begin{aligned} x_0 &= 3 + s \\ y_0 &= -1 + 2s \\ z_0 &= 4s \end{aligned}$$

$T(x_0\, y_0\, z_0) \in e$

$M(-2, -1, 4)$

$\vec{m}(3, 0, -5)$

$\vec{t}(1, 1, 2)$ $\qquad \overrightarrow{TM}(-5-s, -2s, 4-4s)$

$$\begin{vmatrix} -5-s & -2s & 4-4s \\ 1 & 1 & 2 \\ 3 & 0 & -5 \end{vmatrix} = 0$$

$$25 + 5s - 12s - (12 - 12s + 10s) = 0$$

$$25 - 7s - 12 + 2s = 0$$

$$5s = 13 \Rightarrow s = \frac{13}{5}$$

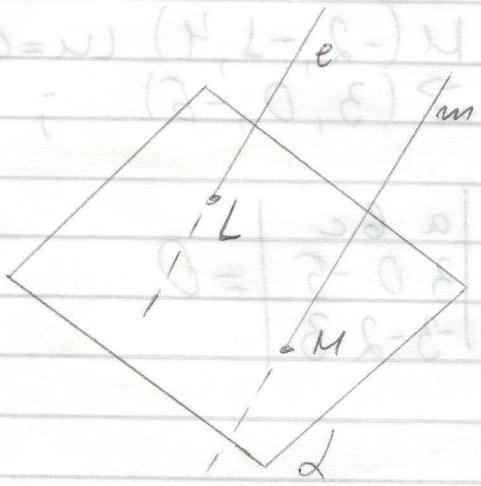
$T\left(\frac{28}{5}, \frac{21}{5}, \frac{52}{5}\right)$ $(\text{or } T(x_0\, y_0\, z_0))$

$L = e \cap \alpha$

$$+s - 3(-1 + 2s) + 4s - 5 = 0$$

$$1 - s = 0 \Rightarrow s = 1$$

$L(4, 1, 4)$



$M = m \cap \alpha$

$-2+3u+3+4-5u-5=0 \Rightarrow u=0$

$M(-2,-1,4)$; $\overrightarrow{LM}(-6,-2,0)$

$$t: \begin{cases} x = 4-6\lambda \\ y = 1-2\lambda \\ z = 4 \end{cases}$$

$$e: \begin{cases} x = 7+s \\ y = 3+2s \\ z = 9-s \end{cases} \qquad m: \begin{cases} x = 3-7u \\ y = 1+2u \\ z = 1+3u \end{cases}$$

$L(7+s, 3+2s, 9-s)$

$M(3-7u, 1+2u, 1+3u)$

$\overrightarrow{LM}(-4-s-7u, -2-2s+2u, -8+s+3u)$

$\vec{e}(1,2,1)$

$\vec{m}(7,2,3)$

$$\left| \begin{array}{l} \overrightarrow{LM}\,\vec{e} = 0 \\ \overrightarrow{LM}\,\vec{m} = 0 \end{array} \right\} \Rightarrow$$

$$\left| \begin{array}{l} -4-s-7u-4-4s-4u+8-s-3u=0 \\ 28+7s+49u-4-4s+4u-24+3s+9u=0 \end{array} \right.$$

$$\left| \begin{array}{l} -4s-6u=0 \\ 6s+62u=0 \end{array} \right\} \Rightarrow \quad s=u=0$$

$L(7,3,9)$

$M(3,1,1)$

$\overrightarrow{LM}(-4,-2,-8)$

$$\alpha: \begin{cases} x = 7-4\lambda \\ y = 3-2\lambda \\ z = 9-8\lambda \end{cases}$$

$|\overrightarrow{LM}| = \sqrt{16+4+64} = \sqrt{84} = 2\sqrt{21}$

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