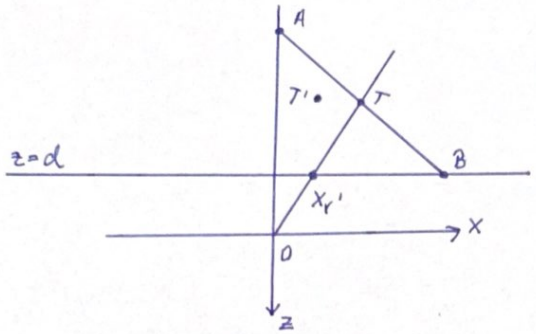
3D grafika 3. zadatak 2. zadaća

$x \mapsto \frac{d}{z}x \quad y \mapsto \frac{d}{z}y \quad z \mapsto z \quad T=(x,y,z) \quad , z=d$



$d=-1 \quad , A=(0,0,-1) \qquad A=A'$

$B=(6,0,0) \qquad B=B'$

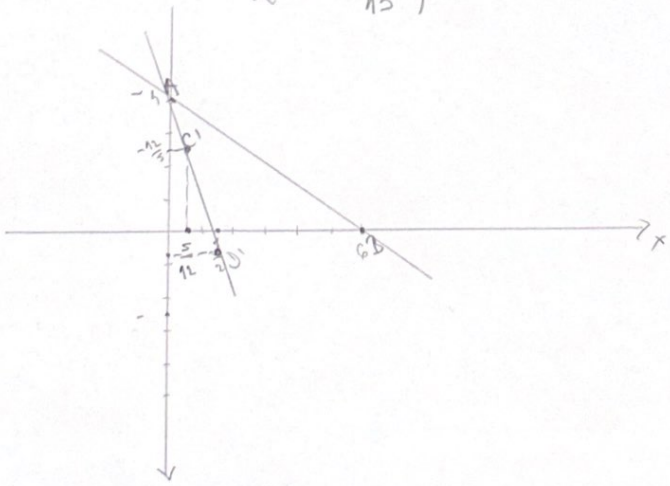
a) $C=\left(\frac{12}{5},0,-\frac{12}{5}\right) \quad D=\left(5,0,-\frac{2}{3}\right) \qquad C'=? \quad D'=?$

- $\frac{12}{5} \mapsto \frac{-1}{\frac{1}{-\frac{12}{5}}}=\frac{5}{12} \quad , \quad 0 \mapsto \frac{-1}{\frac{1}{-\frac{12}{5}}}\cdot 0=0 \quad , \quad -\frac{12}{5} \mapsto -\frac{12}{5} \Rightarrow C'=\left(\frac{5}{12},0,-\frac{12}{5}\right)$

- $5 \mapsto \frac{-1}{\frac{1}{-\frac{2}{3}}}=\frac{3}{2} \quad , \quad 0 \mapsto 0 \quad , \quad -\frac{2}{3} \mapsto -\frac{2}{3} \Rightarrow D'=\left(\frac{3}{2},0,-\frac{2}{3}\right)$

$\overrightarrow{AB}=(6,0,1) \qquad \overrightarrow{C'D'}=\left(\frac{13}{2},0,\frac{26}{15}\right)$

$(B-A) \qquad (D'-C')$

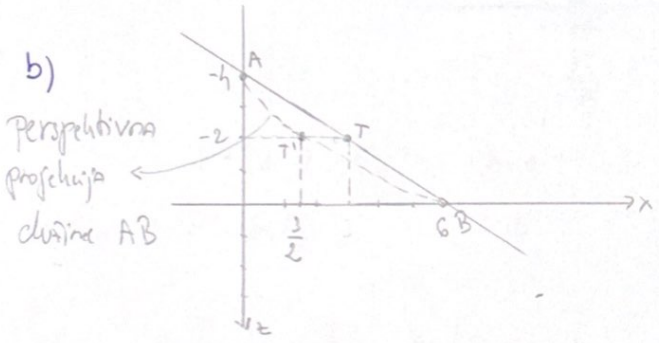


Vektori su paralelni ako su kolinearni $\exists \lambda \in \mathbb{R}$ t.d. $\vec{a} = \lambda \cdot \vec{b}$

$$(6,0,4) = \lambda \cdot \left(\frac{13}{2}, 0, \frac{26}{15}\right)$$

$$\left.\begin{array}{l} 6 = \lambda \cdot \frac{13}{2} \Rightarrow \lambda = \frac{12}{13} \\ 0 = \lambda \cdot 0 \\ 4 = \lambda \cdot \frac{26}{15} \Rightarrow \lambda = \frac{30}{13} \end{array}\right\} \neq \Rightarrow \text{Vektori nisu kolinearni.} \Rightarrow \text{nisu paralelni}$$

b)



Perspektivna projekcija dužine AB

$A = A' = (0,0,-4)$

$B = B' = (6,0,0)$

$x_T = \frac{1}{2}(x_A + x_B) = \frac{1}{2}(0+6) = \frac{1}{2} \cdot 6 = \frac{6}{2} = 3$ $\quad x_{T'} = \frac{d}{z_A + z_B}(x_A + x_B) = \frac{-1}{-4}(6) = \frac{-6}{-4} = \frac{3}{2}$

$y_T = \frac{1}{2}(y_A + y_B) = \frac{1}{2}(0+0) = 0$ $\quad y_{T'} = \frac{d}{z_A + z_B}(y_A + y_B) = \frac{-1}{-4}(0+0) = 0$

$z_T = \frac{1}{2}(z_A + z_B) = \frac{1}{2}(-4+0) = \frac{1}{2} \cdot (-4) = \frac{-4}{2} = -2$ $\quad z_{T'} = \frac{1}{2}(z_A + z_B) = \frac{1}{2} \cdot (-4) = -2$

$\Rightarrow T = (3,0,-2)$ $\quad \Rightarrow T' = \left(\frac{3}{2}, 0, -2\right)$