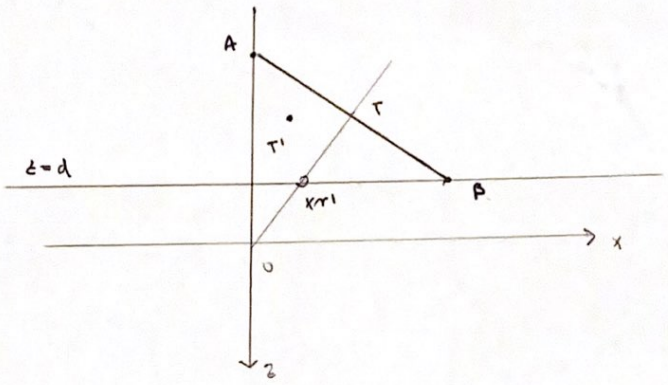
nalg 3.

Zadana je perspektivna transformacija koja preslikava točke (x,y,z)

$$x \mapsto \frac{d}{z}\,x, \quad y \mapsto \frac{d}{z}\,y, \quad z \mapsto z$$

Točku $T=(x,y,z)$ projiciramo na ravninu

$z=d$



$d=-1$

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

$B=(6,0,0)$

$A=A'$, $B=B'$ } perspektivna transformacija točaka A i B

a) $C=\left(\frac{12}{5},0,-\frac{12}{5}\right)$

$D=\left(5,0,-\frac{2}{3}\right)$

→ TRANSFORMACIJE:

• $C=\left(\frac{12}{5},0,-\frac{12}{5}\right)$

$\frac{12}{5} \mapsto \frac{-1}{-\frac{12}{5}} = \frac{5}{12}$

$0 \mapsto 0$

$-\frac{12}{5} \mapsto -\frac{12}{5}$

$\Rightarrow \boxed{C'=\left(\frac{5}{12},0,-\frac{12}{5}\right)}$

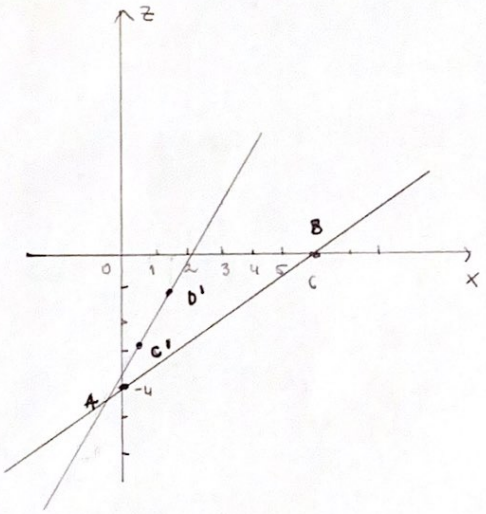
• $D=\left(5,0,-\frac{2}{3}\right)$

$5 \mapsto \frac{-1}{-\frac{2}{3}} = \frac{3}{2}$

$0 \mapsto 0$

$-\frac{2}{3} \mapsto -\frac{2}{3}$

$\Rightarrow \boxed{D'=\left(\frac{3}{2},0,-\frac{2}{3}\right)}$



→ DOKAZ DA PRAVCI NISU PARALELNI

$\vec{v_1} = B - A$

$\vec{v_2} = D' - C'$

→ Treba pokazati da vrijedi:

$$\boxed{\vec{v_1}\cdot\vec{v_2} \neq \|\vec{v_1}\|\cdot\|\vec{v_2}\|\cdot\cos 0^\circ}$$

$\cos 0^\circ = 1$

$\vec{v_1}=(6,0,4)$

$\vec{v_2}=\left(\frac{13}{12},0,\frac{26}{15}\right)$

$\|\vec{v_2}\| = \frac{13\sqrt{89}}{60} = 2{,}044$

$\|\vec{v_1}\| = 2\sqrt{13} = 7{,}211$

$\|\vec{v_1}\|\cdot\|\vec{v_2}\| = 14{,}74$

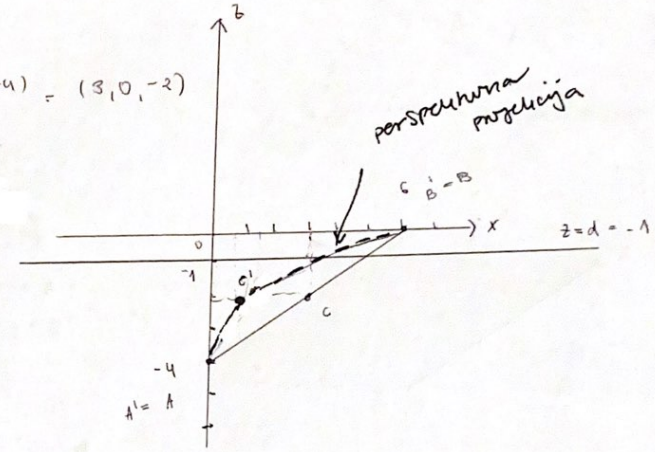
$\vec{v_1}\cdot\vec{v_2} = \frac{403}{30} = 13{,}433$

$\Big\}\ \neq$

$\Rightarrow$ pravci nisu paralelni

b) Izračunaj kako izgleda perspektivna projekcija dužine AB

$$C = \frac{B+A}{2} = \frac{(6,0,-4)}{2} = (3,0,-2)$$



$$\boxed{C = (3,0,-2)}$$

$$x_{C'} = \frac{-1}{-2} = \frac{1}{2}$$

$$y_{C'} = 0$$

$$z_{C'} = -2$$

$$\boxed{C' = \left(\frac{1}{2},0,-2\right)}$$