$$\vec{u} = \left(\frac{\sqrt{2}}{2} , -\frac{1}{2} , -\frac{1}{2} \right) = \frac{1}{2}\left(\sqrt{2} , -1 , -1\right)$$

$$\vec{v} = \left(-\frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4} , -\frac{\sqrt{3}}{4} - \frac{1}{4} , -\frac{\sqrt{3}}{4} - \frac{1}{4} \right)$$

$$\varphi = ? \qquad \vec{u} \cdot \vec{v} = \underbrace{|\vec{u}| \cdot |\vec{v}|}\, \cos\varphi \longrightarrow \cos\varphi = \frac{\sqrt{3}}{2}$$

$$\boxed{\varphi = \frac{\pi}{6}}$$

$$|\vec{u}|^2 = \frac{1}{4}\left(\sqrt{2}^2 + (-1)^2 + (-1)^2\right) = 1$$

$$|\vec{v}|^2 = \frac{1}{16}\left[(\sqrt{6}-\sqrt{2})^2 + (1+\sqrt{3})^2 + (1+\sqrt{3})^2\right]$$

$$= \frac{1}{16}\left[6 - \cancel{2\sqrt{12}} + 2 + 2 + \cancel{4\sqrt{3}} + 6\right] = 1$$

$$\vec{u} \cdot \vec{v} = \frac{1}{8}\left(\sqrt{12} - 2 + 1 + \sqrt{3} + 1 + \sqrt{3}\right) = \frac{4\sqrt{3}}{8} = \frac{\sqrt{3}}{2}$$

$A=[2,5,10]$ $\quad$ $B=[2,1,7]$

osa

$X \in x$ tak, aby $|\measuredangle ABX| = 60^\circ$

$\vec{u}\cdot\vec{v} = |\vec{u}|\cdot|\vec{v}|\cos\varphi$

$\varphi = 60^\circ = \frac{\pi}{3}$

$\cos\varphi = \frac{1}{2}$

$\vec{u} = \overrightarrow{BA} = (0,4,3)$

$\vec{v} = \overrightarrow{BX} = (x-2,-1,-7)$

$X = [x,0,0]$

$|\vec{u}| = \sqrt{4^2+3^2} = 5$

$\vec{u}\cdot\vec{v} = 0-4-21 = -25$

$|\vec{v}|^2 = (x-2)^2+1+49$

$= x^2-4x+4+50$

$-25 = 5\cdot\left[x^2-4x+54\right]^{1/2}\cdot\frac{1}{2}$

$-10 = \sqrt{x^2-4x+54}$ $\quad$ $N\bar{R}$

$\vec{v} = a_1 \vec{x}_1 + a_2 \vec{x}_2 + \dots$ $\qquad a_{11} a_{21} \cdots \neq 0$

Rozhodněte, zda $\{\vec{u}_i\}_{i=1}^{3}$ jsou LZ

$\vec{u}_1 = (3, 6) \quad \vec{u}_2 = (-1, -2) \quad \vec{u}_3 = (1, 4)$

$\vec{u}_3 = x \cdot \vec{u}_1 + y \vec{u}_2$

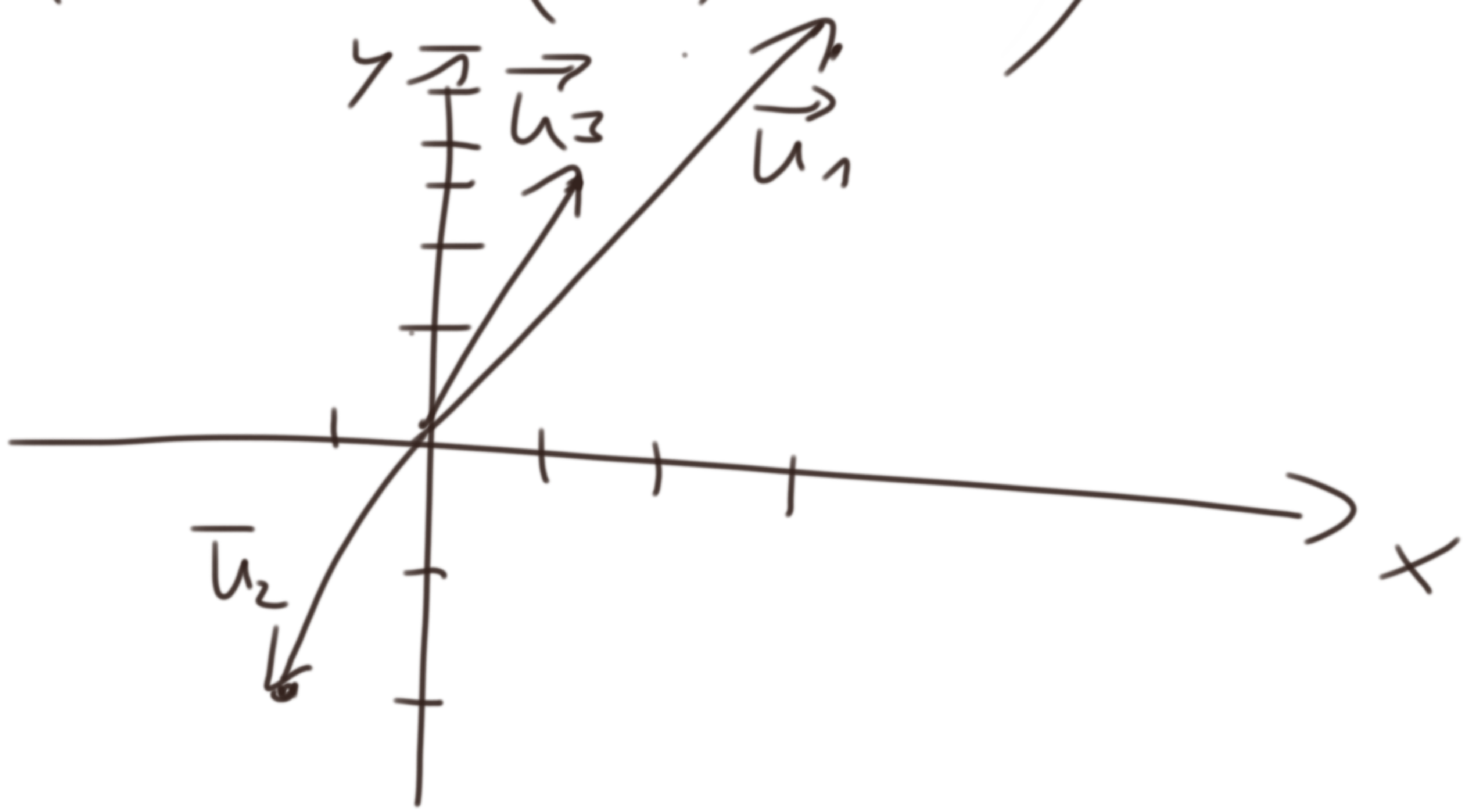
$$x \cdot \begin{pmatrix} 3 \\ 6 \end{pmatrix} + y \begin{pmatrix} -1 \\ -2 \end{pmatrix} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$$

$$\left.\begin{aligned} 3x - y &= 1 \quad /\cdot(-2) \\ 6x - 2y &= 4 \end{aligned}\right\} \oplus$$

$$0 = 2$$

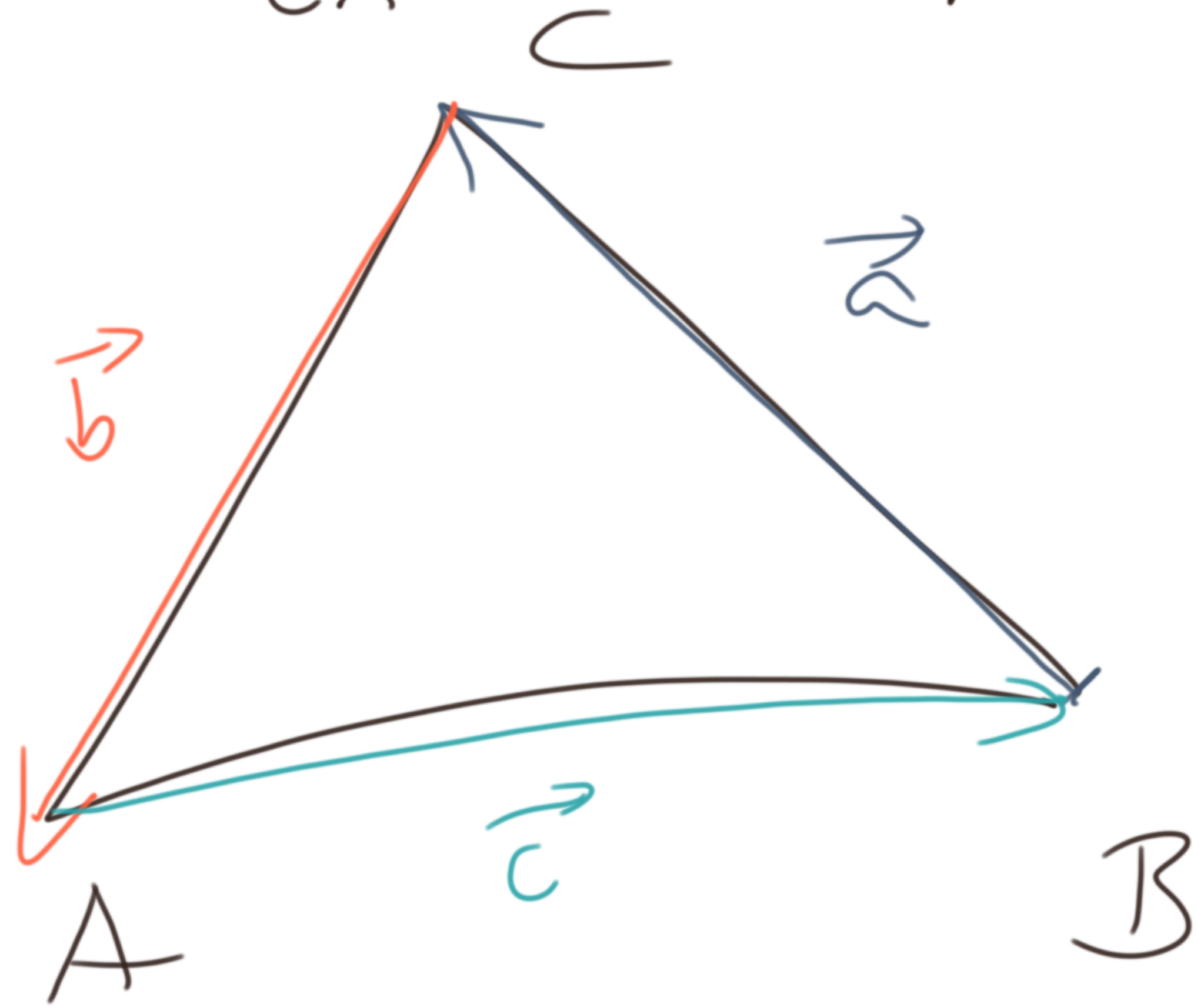
NŘ

$\vec{u}_1 = -3 \vec{u}_2 + 0 \cdot \vec{u}_3$



$\triangle ABC$:

$\vec{a} = C - B$ ($\overrightarrow{BC}$) $\vec{b} = A - C$ ($\overrightarrow{CA}$) $\vec{c} = B - A$ ($\overrightarrow{AB}$)



Ukažte, že $\vec{a} + \vec{b} + \vec{c} = 0$

$$\vec{a} + \vec{b} + \vec{c} =$$

$$(C - B) + (A - C) + (B - A) = 0$$