

Zadatak 16. Uporabom skalarnog umnoška odredi kutove trokuta ABC , $A(-2, 0)$, $B(4, -3)$, $C(1, 6)$.

Rješenje.

$$\begin{aligned}\vec{AB} &= (4 + 2)\vec{i} + (-3 - 0)\vec{j} \\ &= 6\vec{i} - 3\vec{j}\end{aligned}$$

$$\vec{BA} = -6\vec{i} + 3\vec{j}$$

$$\begin{aligned}\vec{AC} &= (1 + 2)\vec{i} + (6 - 0)\vec{j} \\ &= 3\vec{i} + 6\vec{j}\end{aligned}$$

$$\begin{aligned}\vec{BC} &= (1 - 4)\vec{i} + (6 + 3)\vec{j} \\ &= -3\vec{i} + 9\vec{j}\end{aligned}$$

$$|\vec{AB}| = \sqrt{36 + 9} = \sqrt{45} = 3\sqrt{5}$$

$$|\vec{AC}| = \sqrt{9 + 36} = 3\sqrt{5}$$

$$|\vec{BC}| = \sqrt{9 + 81} = \sqrt{90} = 3\sqrt{10}$$

$$\begin{aligned}\cos \alpha &= \frac{\vec{AB} \cdot \vec{AC}}{|\vec{AB}| \cdot |\vec{AC}|} \\ &= \frac{6 \cdot 3 - 3 \cdot 6}{3\sqrt{5} \cdot 3\sqrt{5}} = 0 \implies \alpha = 90^\circ\end{aligned}$$

$$\begin{aligned}\cos \beta &= \frac{\vec{BA} \cdot \vec{BC}}{|\vec{BA}| \cdot |\vec{BC}|} \\ &= \frac{-6 \cdot (-3) + 3 \cdot 9}{3\sqrt{5} \cdot 3\sqrt{10}} \\ &= \frac{18 + 27}{9 \cdot 5\sqrt{2}} \\ &= \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \implies \beta = 45^\circ \\ \gamma &= 45^\circ\end{aligned}$$