Zadatak 18. Odredi kut između dijagonala paralelograma $ABCD$ ako je $\overrightarrow{AB} = 4\vec{\imath} - 3\vec{\jmath}$, $\overrightarrow{AD} = 6\vec{\imath} + \vec{\jmath}$.

Rješenje.

$$\overrightarrow{AC} = \overrightarrow{AB} + \overrightarrow{BD} = 4\vec{\imath} - 3\vec{\jmath} + 6\vec{\imath} + \vec{\jmath} = 10\vec{\imath} - 2\vec{\jmath},$$

$$|\overrightarrow{AC}| = \sqrt{100+4} = \sqrt{104} = 2\sqrt{26}$$

$$\overrightarrow{BD} = \overrightarrow{AD} - \overrightarrow{AB} = 6\vec{\imath} + \vec{\jmath} - 4\vec{\imath} + 3\vec{\jmath} = 2\vec{\imath} + 4\vec{\jmath},$$

$$|\overrightarrow{BD}| = \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$$

$$\cos\varphi = \frac{\overrightarrow{AC} \cdot \overrightarrow{BD}}{|\overrightarrow{AC}| \cdot |\overrightarrow{BD}|} = \frac{10 \cdot 2 - 2 \cdot 4}{2\sqrt{26} \cdot 2\sqrt{5}} = \frac{12}{4\sqrt{130}} = \frac{3}{130}$$

$$\varphi = \arccos\frac{3}{\sqrt{130}} \approx 74°44'.$$