Zadatak 15. Riješi na intervalu $[0, 2\pi]$ nejednadžbu

$$\sin x + \sqrt{3}\cos x > 0.$$

Rješenje.

<u>I. kvadrant</u>

$$\sin x > 0, \quad \cos x > 0;$$
$$\sin x + \sqrt{3}\cos x > 0$$
$$\sin x > -\sqrt{3}\cos x \ / : \cos x$$
$$\operatorname{tg} x > -\sqrt{3}, \quad \text{vrijedi } \forall x \in \left\langle 0, \frac{\pi}{2} \right\rangle$$

<u>II. kvadrant</u>

$$\sin x > 0, \quad \cos x < 0;$$
$$\sin x + \sqrt{3}\cos x > 0$$
$$\sin x > -\sqrt{3}\cos x \ / : \cos x$$
$$\operatorname{tg} x < -\sqrt{3} \quad \left(\operatorname{tg}\frac{2\pi}{3} = -\sqrt{3}\right)$$
$$\operatorname{tg} x < \operatorname{tg}\frac{2\pi}{3} \implies x \in \left[\frac{\pi}{2}, \frac{2\pi}{3}\right\rangle$$

<u>III. kvadrant</u>

$$\sin x < 0, \quad \cos x < 0;$$
$$\sin x + \sqrt{3}\cos x > 0$$
$$\sin x > -\sqrt{3}\cos x \ / : \cos x$$
$$\operatorname{tg} x < -\sqrt{3} \implies \text{nema rješenja jer je u III. kvadrantu } \operatorname{tg} x > 0, \ \forall x$$

<u>IV. kvadrant</u>

$$\sin x < 0, \quad \cos x > 0;$$
$$\sin x + \sqrt{3}\cos x > 0$$
$$\sin x > -\sqrt{3}\cos x \ / : \cos x$$
$$\operatorname{tg} x > -\sqrt{3} \quad \left(\operatorname{tg}\frac{5\pi}{3} = -\sqrt{3}\right)$$
$$\operatorname{tg} x > \operatorname{tg}\frac{5\pi}{3} \implies x \in \left\langle \frac{5\pi}{3}, 2\pi \right\rangle$$

Unija rješenja: $\left\langle 0, \frac{2\pi}{3} \right\rangle \cup \left\langle \frac{5\pi}{3}, 2\pi \right\rangle.$