Zadatak 13. Riješi jednadžbu $f'(x) = 0$, ako je:

1) $f(x)=2\cos x+x$; **2)** $f(x) = \sin x + \frac{x}{2}$;

3) $f(x)=\sin x+\cos x$; **4)** $f(x) = \operatorname{tg} x + \operatorname{ctg} x$.

Rješenje. **1)** $f'(x) = (2\cos x + x)' = (2\cos x)' + x' = -2\sin x + 1$,

$$-2\sin x + 1 = 0$$
$$\sin x = \frac{1}{2}$$
$$x = \frac{\pi}{6} + k \cdot 2\pi \text{ ili}$$
$$x = \frac{5\pi}{6} + k \cdot 2\pi,\ k \in \mathbf{Z};$$

2) $f'(x) = (\sin x + \frac{x}{2})' = (\sin x)' + \left(\frac{x}{2}\right)' = \cos x + \frac{1}{2}$,

$$\cos x + \frac{1}{2} = 0$$
$$\cos x = -\frac{1}{2}$$
$$x = \pm\frac{\pi}{3} + k \cdot 2\pi,\ k \in \mathbf{Z};$$

3) $f'(x) = (\sin x + \cos x)' = (\sin x)' + (\cos x)' = \cos x - \sin x$,

$$\cos x - \sin x = 0$$
$$\cos x = \sin x / : \cos x,\ \cos x \neq 0$$
$$\operatorname{tg} x = 0$$
$$x = \frac{\pi}{4} + k \cdot \pi,\ k \in \mathbf{Z};$$

4) $f'(x) = (\operatorname{tg} x + \operatorname{ctg} x)' = (\operatorname{tg} x)' + (\operatorname{ctg} x)' = \frac{1}{\cos^2 x} - \frac{1}{\sin^2 x}$,

$$\frac{1}{\cos^2 x} - \frac{1}{\sin^2 x} = 0 / \cdot \sin^2 x$$
$$\operatorname{tg}^2 x - 1 = 0$$
$$\operatorname{tg}^2 x = 1$$
$$\operatorname{tg} x = \pm 1$$
$$x = \frac{\pi}{4} + k \cdot \frac{\pi}{2},\ k \in \mathbf{Z}.$$