

Zadatak 35. Ako je $f\left(x - \frac{3\pi}{4}\right) = \sqrt{2}(\sin x - \cos x)$, koliko je $f\left(\frac{11\pi}{12}\right)$?

Rješenje.

$$f\left(x - \frac{3\pi}{4}\right) = \sqrt{2}(\sin x - \cos x),$$

$$x - \frac{3\pi}{4} = t \iff x = t + \frac{3\pi}{4};$$

$$f(t) = \sqrt{2}\left[\sin\left(t + \frac{3\pi}{4}\right) - \cos\left(t + \frac{3\pi}{4}\right)\right]$$

$$= \sqrt{2}\left[\sin t \cos \frac{3\pi}{4} + \cos t \sin \frac{3\pi}{4} - \cos t \cos \frac{3\pi}{4} + \sin t \sin \frac{3\pi}{4}\right]$$

$$= \sqrt{2}\left[-\frac{\sqrt{2}}{2} \sin t + \frac{\sqrt{2}}{2} \cos t + \frac{\sqrt{2}}{2} \cos t + \frac{\sqrt{2}}{2} \sin t\right] = 2 \cos t;$$

$$f\left(\frac{11\pi}{12}\right) = 2 \cos \frac{11\pi}{12} = 2 \cos\left(\frac{2}{3}\pi + \frac{1}{4}\pi\right)$$

$$= 2\left[\cos \frac{2\pi}{3} \cos \frac{\pi}{4} - \sin \frac{2\pi}{3} \sin \frac{\pi}{4}\right] = 2\left(-\frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2}\right)$$

$$= -2 \cdot \frac{\sqrt{2}}{4}(1 + \sqrt{3}) = -\frac{\sqrt{2}}{2}(1 + \sqrt{3}).$$