

Zadatak 12. Odredi temeljni period sljedećih funkcija:

1) $f(x) = \sin 2x + \cos 3x$;

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

3) $f(x) = \sin \frac{3}{2}x + 3 \cdot \cos \frac{3}{4}x$;

4) $f(x) = \sin 4x + \sin 6x$;

5) $f(x) = \cos \pi x + \sin \frac{\pi}{3}x$;

6) $f(x) = \sin x + \sin 2x + \sin 3x$.

Rješenje.

1) $f(x) = \underbrace{\sin 2x}_{g(x)} + \underbrace{\cos 3x}_{h(x)}$

$$\omega_g = 2, P_g = \frac{2\pi}{\omega_g} = \frac{2\pi}{2} = \pi;$$

$$\omega_h = 3, P_h = \frac{2\pi}{\omega_h} = \frac{2\pi}{3} = \frac{2\pi}{3};$$

$$P_f = V(P_g, P_h) = V\left(\pi, \frac{2\pi}{3}\right) = 2\pi$$

$$P_0 = 2\pi;$$

2) $f(x) = \underbrace{\sin 2x}_{g(x)} + \underbrace{\cos \frac{x}{2}}_{h(x)}$

$$\omega_g = 2, P_g = \frac{2\pi}{\omega_g} = \frac{2\pi}{2} = \pi;$$

$$\omega_h = \frac{1}{2}, P_h = \frac{2\pi}{\omega_h} = \frac{2\pi}{\frac{1}{2}} = 4\pi;$$

$$P_f = V(P_g, P_h) = V(\pi, 4\pi) = 4\pi;$$

3) $f(x) = \underbrace{\sin \frac{3}{2}x}_{g(x)} + 3 \cdot \underbrace{\cos \frac{3}{4}x}_{h(x)}$

$$\omega_g = \frac{3}{2}, P_g = \frac{2\pi}{\omega_g} = \frac{2\pi}{\frac{3}{2}} = \frac{4\pi}{3};$$

$$\omega_h = \frac{3}{4}, P_h = \frac{2\pi}{\omega_h} = \frac{2\pi}{\frac{3}{4}} = \frac{8\pi}{3};$$

$$P_f = V(P_g, P_h) = V\left(\frac{4\pi}{3}, \frac{8\pi}{3}\right) = \frac{8\pi}{3};$$

4) $f(x) = \underbrace{\sin 4x}_{g(x)} + \underbrace{\sin 6x}_{h(x)}$

$$\omega_g = 4, P_g = \frac{2\pi}{\omega_g} = \frac{2\pi}{4} = \frac{\pi}{2};$$

$$\omega_h = 6, P_h = \frac{2\pi}{\omega_h} = \frac{2\pi}{6} = \frac{\pi}{3};$$

$$P_f = V(P_g, P_h) = V\left(\frac{\pi}{2}, \frac{\pi}{3}\right) = \pi;$$

$$\mathbf{5) } f(x) = \cos \pi x + \sin \frac{\pi}{3}x$$

$$f(x) = \underbrace{\cos \pi x}_{g(x)} + \underbrace{\sin \frac{\pi}{3}x}_{h(x)}$$

$$\omega_g = \pi, P_g = \frac{2\pi}{\omega_g} = \frac{2\pi}{\pi} = 2;$$

$$\omega_h = \frac{\pi}{3}, P_h = \frac{2\pi}{\omega_h} = \frac{2\pi}{\frac{\pi}{3}} = 6;$$

$$P_f = V(P_g, P_h) = V(2, 6) = 6;$$

$$\mathbf{6) } f(x) = \sin x + \sin 2x + \sin 3x$$

$$f(x) = \underbrace{\sin x}_{g(x)} + \underbrace{\sin 2x}_{h(x)} + \underbrace{\sin 3x}_{i(x)}$$

$$P_g = 2\pi;$$

$$\omega_h = 2, P_h = \frac{2\pi}{\omega_h} = \frac{2\pi}{2} = \pi;$$

$$\omega_i = 3, P_i = \frac{2\pi}{\omega_i} = \frac{2\pi}{3};$$

$$P_f = V(P_g, P_h, P_i) = V\left(2\pi, \pi, \frac{2\pi}{3}\right) = 2\pi.$$