

Параметры гармонического колебания

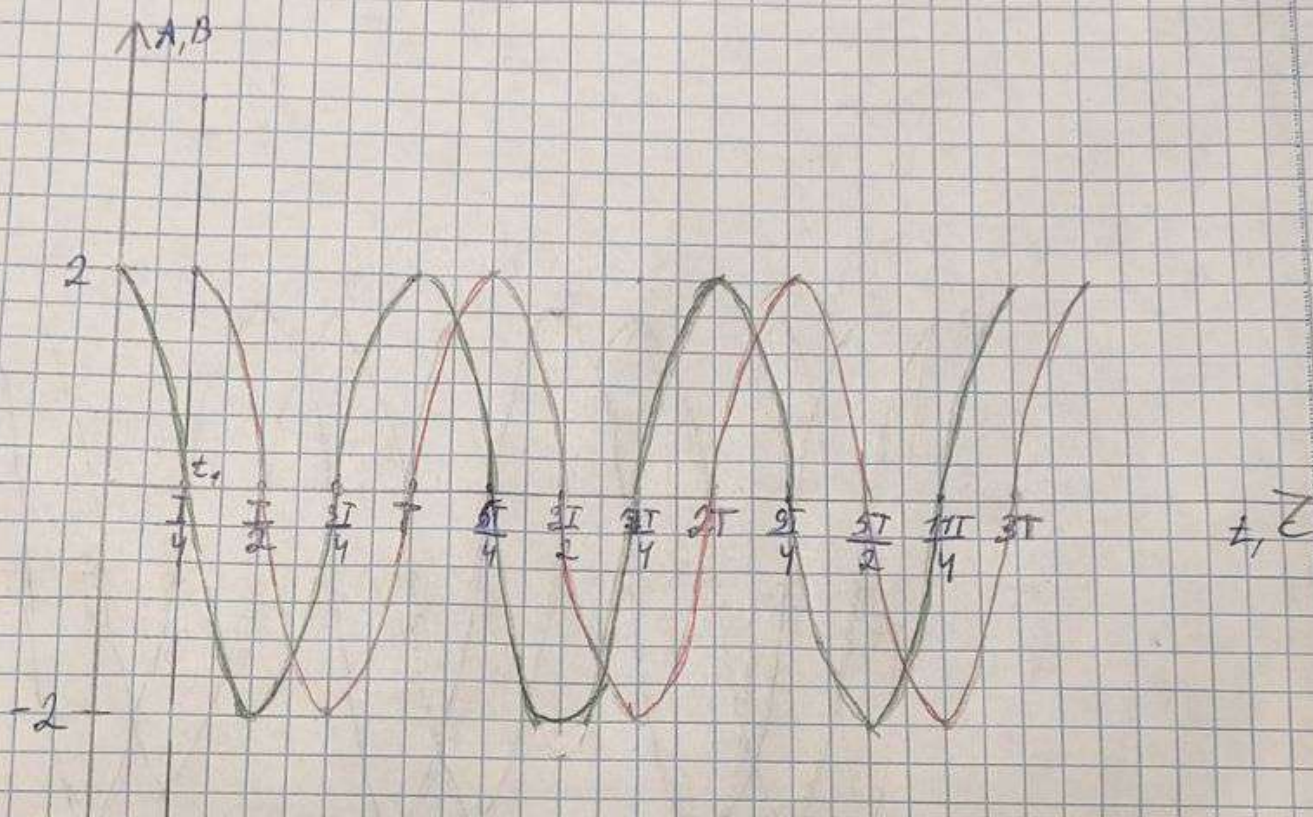
1

$$2 \cos(1,4\pi t - 0,5\pi); A=2, \omega=1,4\pi; \varphi=-0,5\pi$$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{1,4\pi} \approx 1,43 \text{ c}$$

$$-\omega t_1 = \varphi \Rightarrow t_1 = -\frac{\varphi}{\omega}$$

$$t_1 = \frac{0,5\pi}{1,4\pi} \approx 0,36 \text{ c}$$



2

$$t_1 = -1 \text{ c};$$

$$\omega t_1 = \varphi$$

$$1,4\pi \cdot 1 = \varphi \Rightarrow \varphi = 1,4\pi$$

$$t_2 = 3 \text{ c};$$

$$-1,4\pi \cdot 3 = \varphi \Rightarrow \varphi = -4,2\pi$$

$$t_3 = 7 \text{ c};$$

$$-1,4\pi \cdot 7 = \varphi \Rightarrow \varphi = -9,8\pi$$

3

$$Z_1 = a + ib, Z_2 = a - ib$$

$$a = 4j, b = 3$$

$$Z = |Z| e^{i \arg Z}$$

$$|Z_1| = |Z_2| = \sqrt{4^2 + 3^2} = 5$$

$$\arg Z_1 = \arctan \frac{3}{4} \approx 0,64$$

$$\arg Z_2 = \arctan -\frac{3}{4} = \arctan \frac{3}{4} + \pi \approx$$

$$\approx 3,78 \left[\begin{array}{l} Z_1 = 5 e^{0,64i} \\ Z_2 = 5 e^{3,78i} \end{array} \right]$$

4

$$Z = 5e^{i\frac{\pi}{3}}$$

$$|Z|e^{i\varphi} = |Z|(\cos\varphi + i\sin\varphi)$$

$$Z = 5\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$$

$$\cos\frac{\pi}{3} = a = 0,5; \quad \sin\frac{\pi}{3} = b = \frac{\sqrt{3}}{2} \approx 0,86$$

$$Z = 5 \cdot 0,5 + i \cdot (5 \cdot 0,86) = 2,5 + 4,33i$$

Проверка:

$$|Z| = \sqrt{2,5^2 + 4,33^2} \approx 4,99$$

$$\varphi = \arctan\left(\frac{4,33}{2,5}\right) \approx 60^\circ \approx \frac{\pi}{3}$$