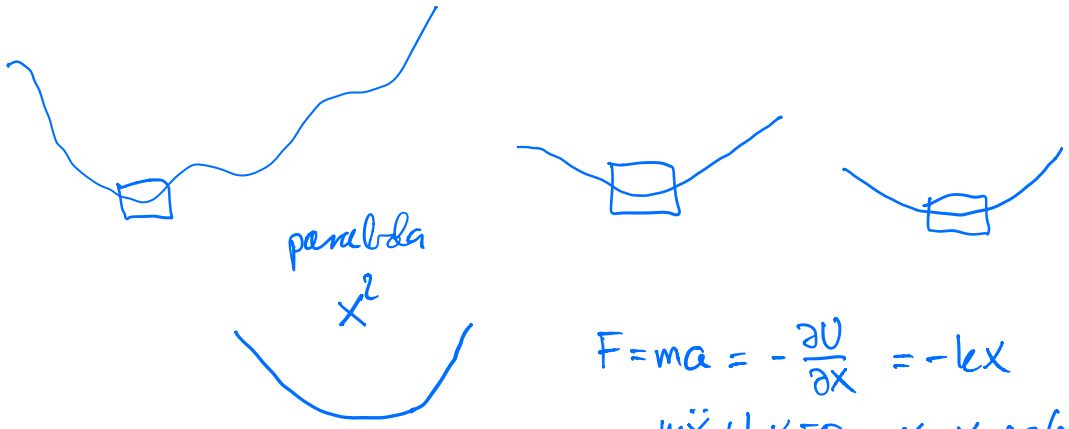


$$F = ma = -\frac{\partial U}{\partial x} = -kx$$

$$m\ddot{x} + kx = 0 \qquad x = x_0 \cos(\omega t + \varphi)$$

majhen

$$U(x) = U_0 + U_1 x + U_2 x^2 + U_3 x^3 + U_4 x^4 + \dots$$

$$x = x_0 \cos(\omega t + \varphi) = \mathrm{Re}\left[x_0 e^{i(\omega t + \varphi)}\right] = \mathrm{Re}\left[x_0 e^{i\varphi} e^{i\omega t}\right]$$

$A = x_0 e^{i\varphi}$ kompleksna amplituda

$$\nu = \frac{1}{T} \qquad \omega = 2\pi\nu = \frac{2\pi}{T}$$

Resonanca $\quad m\ddot{x} + kx = 0 \quad \Rightarrow \quad \ddot{x} + \frac{k}{m} x = 0 \quad \omega_0^2 = \frac{k}{m}$ ω_0 lastna frekvenca

ω $\qquad \ddot{x} + \omega_0^2 x = V \cos\omega t$

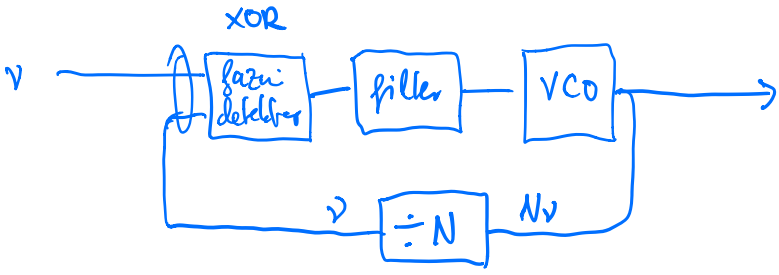
$$\ddot{x} + \beta\dot{x} + \omega_0^2 x = V \cos\omega t$$

Wolfram Mathematica

Takt

Piezoelektrični kristal → E ← $\quad \nu = 100{,}0000\ \mathrm{MHz}$

OCXO, GPS 1s



Pomnoževalnik frekvence

PLL
fazno uklenjena zanka

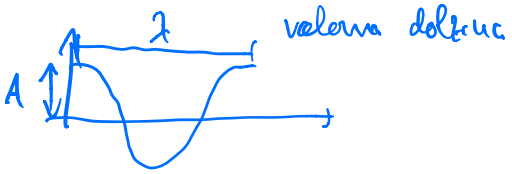
VALOVANJE

$$\frac{\partial^2\psi}{\partial x^2} = \frac{1}{c^2}\frac{\partial^2\psi}{\partial t^2} \qquad \psi = \psi(x,t)$$

$$\psi = f(x - ct) \qquad c = \sqrt{\frac{\text{napetost}}{\text{vztrajnost}}}$$

RAVNI VAL

$$\psi = A\cos(kx - \omega t)$$



valovna dolžina

$\omega = ck \qquad c = \lambda\nu = \lambda/T$

$k = \frac{2\pi}{\lambda}$ valovno število

VAL202 202m $c = 3\cdot10^8$ m/s $\nu = 1{,}48$ MHz

AM SV, HW 550kHz – 1720kHz

$\nu = 10$GHz $\longrightarrow$ $\lambda = 3$cm