(2.)

2D-s négyzetrács rezgéseinek állapotsűrűsége

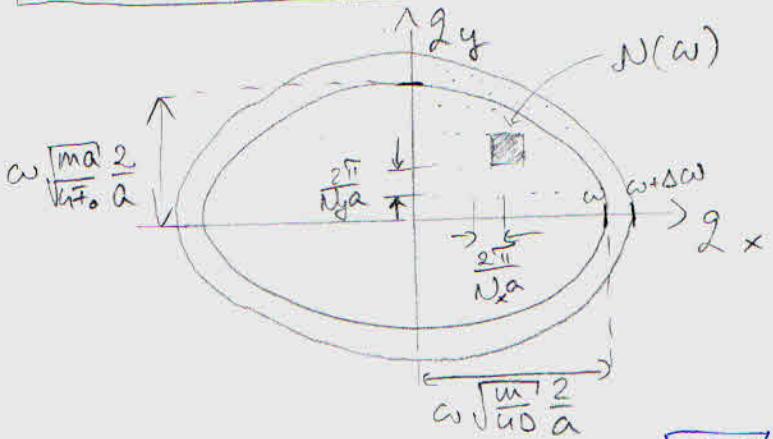
$$\omega_x(q_x, q_y) = \sqrt{\frac{4D}{m}\cdot \sin^2\left(\frac{q_x a}{2}\right) + \frac{4F_0}{ma}\cdot \sin^2\left(\frac{q_y a}{2}\right)}$$

$$\omega_y(q_x, q_y) = \sqrt{\frac{4D}{m}\cdot \sin^2\left(\frac{q_y a}{2}\right) + \frac{4F_0}{ma}\cdot \sin^2\left(\frac{q_x a}{2}\right)}$$

$$\omega_x^2(q_x, q_y) = \frac{4D}{m}\cdot\left(\frac{q_x a}{2}\right)^2 + \frac{4F_0}{ma}\left(\frac{q_y a}{2}\right)^2$$

ellipszis alakra hozva:

$$1 = \frac{q_x^2}{\omega^2 \frac{m}{4D}\left(\frac{2}{a}\right)^2} + \frac{q_y^2}{\omega^2 \frac{ma}{4F_0}\left(\frac{2}{a}\right)^2}$$



$$\mathcal{N}(\omega) = \pi\omega\sqrt{\frac{m}{4D}}\frac{2}{a}\cdot\omega\sqrt{\frac{ma}{F_0}}\frac{1}{a}\cdot\frac{1}{\frac{2\pi}{N_x a}\frac{2\pi}{N_y a}}$$

$$\mathcal{N}(\omega) = \omega^2\sqrt{\frac{m^2 a}{\Delta F_0}}\frac{N_x N_y}{4\pi}$$

$$\frac{d\mathcal{N}}{d\omega} = \omega\cdot\frac{1}{2\pi}\sqrt{\frac{m^2 a}{\Delta F_0}}\underbrace{N_x N_y}_{V/a^2}$$

$$\Delta\mathcal{N}(\omega) = \frac{\omega}{2\pi}\sqrt{\frac{m^2}{\Delta F_0 a^3}}\,V\Delta\omega \longrightarrow g_x(\omega)\text{: lin. függ } \omega\text{-tól}$$

$$g_y(\omega) = g_x(\omega)$$

$$g(\omega) = \frac{\omega}{\pi}\sqrt{\frac{m^2}{\Delta F_0 a^3}}$$