Equation of mechanical oscillation

$$y = A.\sin(\omega t + \varphi_0)$$

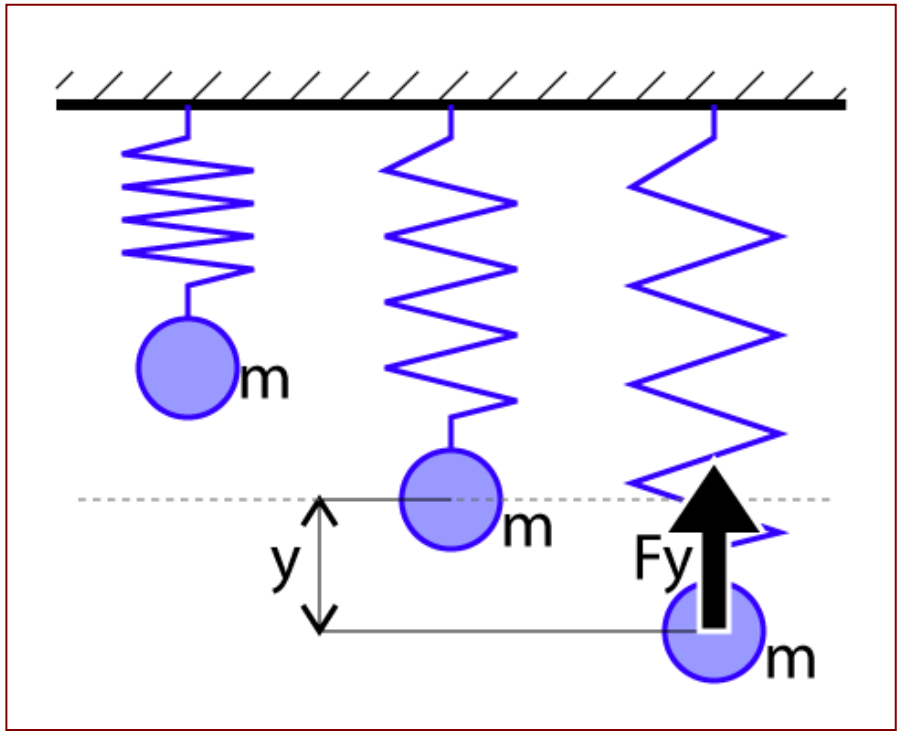
y … deflection
A … amplitude
ω … angular frequency
t … time
φ0 … phase

$$\omega = \sqrt{\frac{k}{m}}$$

ω … a. frequency
k … rigidity
m … mass

Rigidity k:

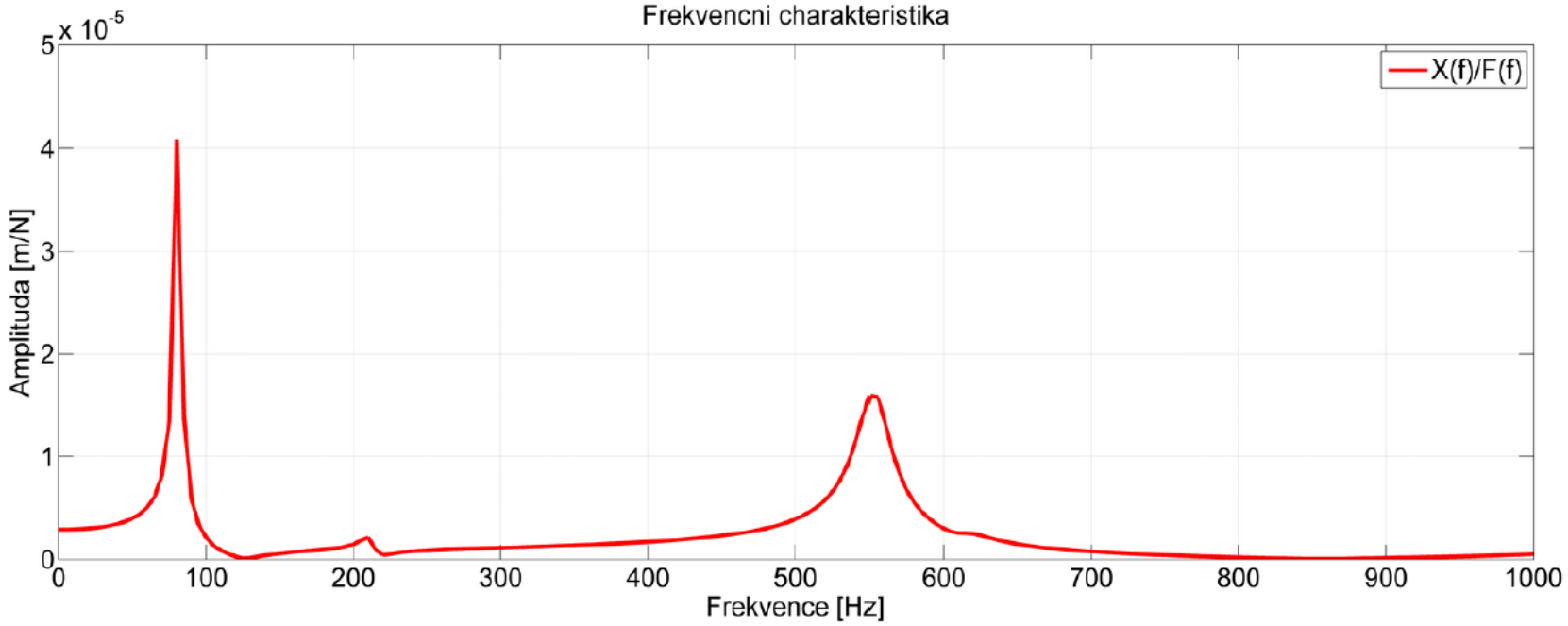
- material
- geometry shape



Modal analysis

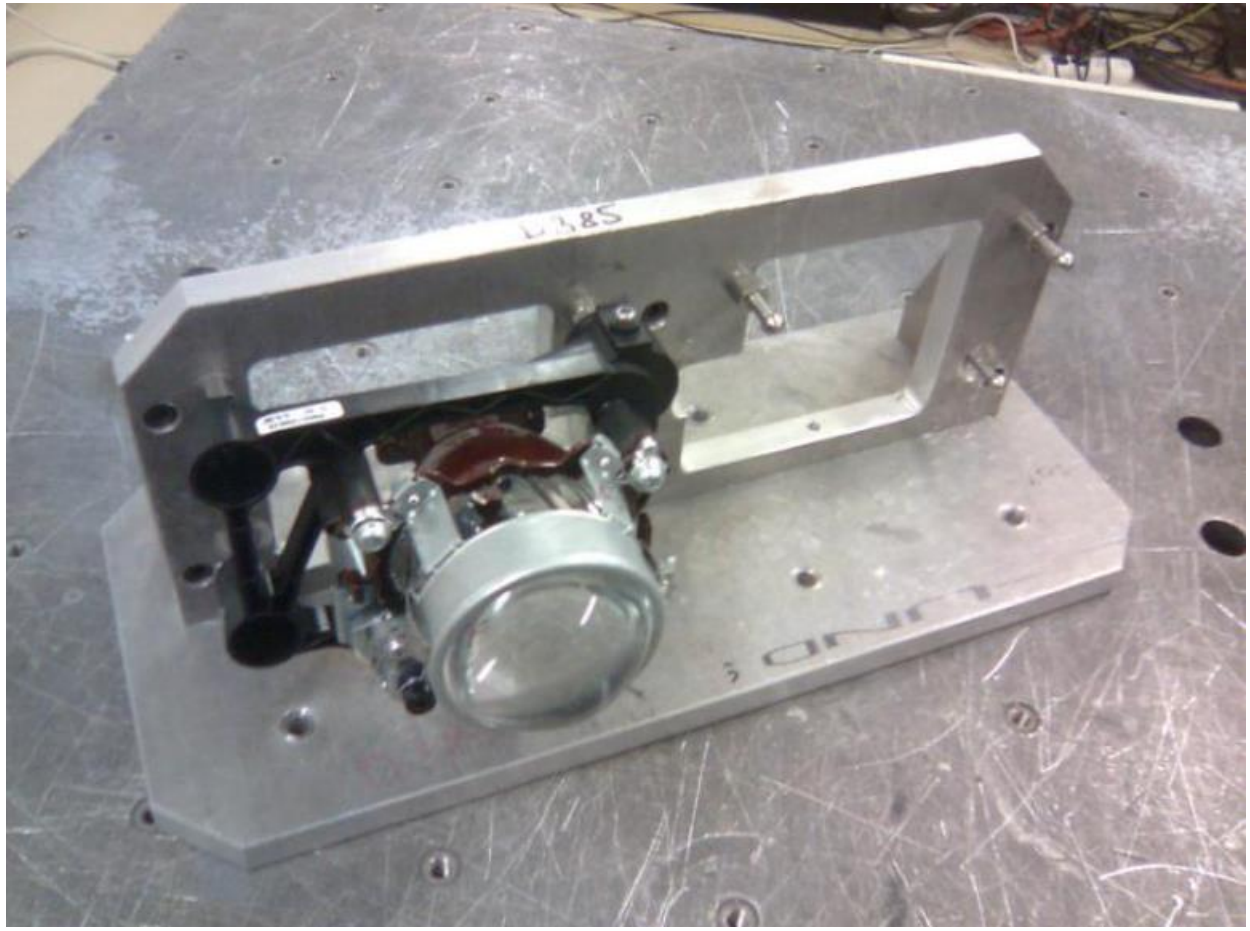
Every solid part or assembly has the behavior in external exciting frequencies.
Range of own frequencies and own shape of oscillation, which are dangerous.
The technical object cut oscillate by high amplitude.

Input: geometry shape, material, boundary condition
Output: own frequency and own shapes of oscillation



Laboratory test of modal analysis

Equipment: vibration table, strength gauges – measurement of local deformation
Object: lighting module from automotive



Dynamic rigidity

Increase dynamic rigidity = Increase value of 1st own frequency
Wider band for trouble-free operation of technical object.