

$$l=92.3\pm0.05\text{ cm} \quad d=0.60\pm0.01\text{ mm} \quad \rho=7.8\cdot10^3\pm?\frac{\text{kg}}{\text{m}^3}-\text{määramatus ei ole antud}$$

$$n=1$$

Katse nr.	m, kg	$f_{\text{gen}}, \text{Hz}$	f_n, Hz	$v, \text{m/s}$	$U_c(v), \text{m/s}$
1	3.210	64.0	64.72	119.47	1.99
2	1.620	46.5	45.98	84.87	1.41
3	0.791	35.5	32.13	59.31	0.99
4	2.411	55.0	56.09	103.54	1.73
5	4.001	72.0	72.26	133.38	2.22

$$n=2$$

Katse nr.	m, kg	$f_{\text{gen}}, \text{Hz}$	f_n, Hz	$v, \text{m/s}$	$U_c(v), \text{m/s}$
6	3.210	123.0	129.44	119.47	1.99
7	1.620	94.0	91.95	84.87	1.41

$$n=3$$

Katse nr.	m, kg	$f_{\text{gen}}, \text{Hz}$	f_n, Hz	$v, \text{m/s}$	$U_c(v), \text{m/s}$
8	3.210	183.0	194.16	119.47	1.99

$$f_n = \frac{n}{2l} \sqrt{\frac{F}{\rho S}}$$

$$v = \sqrt{\frac{F}{\rho S}} = \frac{2}{d} \sqrt{\frac{mg}{\rho \pi}}$$

$$f_n = \frac{n}{2l} \cdot v$$

$$\frac{\partial v}{\partial m} = \frac{\sqrt{\frac{gm}{p}}}{\sqrt{\pi dm}}$$

$$\frac{\partial v}{\partial d} = -2 \frac{\sqrt{\frac{gm}{p}}}{\sqrt{\pi d^2}}$$

$$\frac{\partial v}{\partial \rho} = -\frac{\sqrt{\frac{gm}{\rho}}}{\sqrt{\pi d \rho}}$$

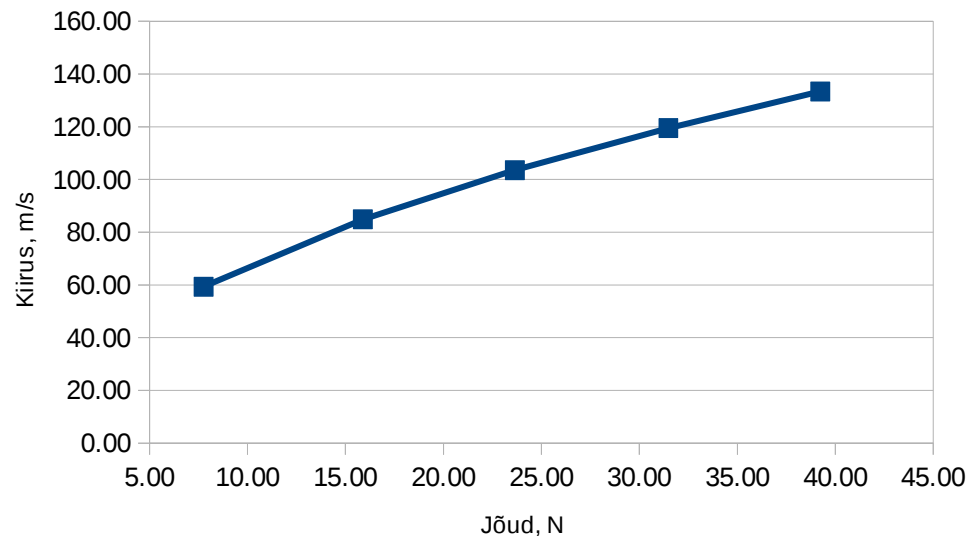
$$U_c(m) = 0.0005 \text{ kg}$$

$$U_c(d) = 10^{-5} \text{ m}$$

$$U_c(\rho) = ?$$

$$U_c(v) = \sqrt{\left(\frac{\partial v}{\partial m} \cdot U_c(m)\right)^2 + \left(\frac{\partial v}{\partial d} \cdot U_c(d)\right)^2}$$

$$\delta = \frac{U_c(v)}{v} \cdot 100 \%$$



Järeldus

$$n=1 \quad f_{n_1} = 64.7 \text{ Hz} \quad f_{n_2} = 46.0 \text{ Hz} \quad f_{n_3} = 32.1 \text{ Hz} \quad f_{n_4} = 56.1 \text{ Hz} \quad f_{n_5} = 72.3 \text{ Hz}$$

$$n=2 \quad f_{n_1} = 129.4 \text{ Hz} \quad f_{n_2} = 92.0 \text{ Hz}$$

$$n=3 \quad f_{n_1} = 194.2 \text{ Hz}$$

$$v_1 = 194.47 \pm 1.99 \frac{\text{m}}{\text{s}^2} \quad \text{usutavus } 0.95 \quad \delta = 1.67 \%$$

$$v_1 = 84.87 \pm 1.41 \frac{\text{m}}{\text{s}^2} \quad \text{usutavus } 0.95 \quad \delta = 1.67 \%$$

$$v_1 = 59.31 \pm 0.99 \frac{\text{m}}{\text{s}^2} \quad \text{usutavus } 0.95 \quad \delta = 1.67 \%$$

$$v_1 = 103.54 \pm 1.73 \frac{\text{m}}{\text{s}^2} \quad \text{usutavus } 0.95 \quad \delta = 1.67 \%$$

$$v_1 = 133.38 \pm 2.22 \frac{\text{m}}{\text{s}^2} \quad \text{usutavus } 0.95 \quad \delta = 1.67 \%$$

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