

Gruppe: 02

Versuch:

Teil:

Namen: Adelind
Elshani
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Akustik (Teil 2)

F. Kelen

Datum:

Stab Dicke: ~~11,5 mm~~ $11,5 \text{ mm} + 0,48 \text{ mm}$

Länge: 130 cm Dicke: $11,97 \text{ mm} \pm 0,003 \text{ mm}$

Peaks: 1. 1293,66 Hz

~~1292,88 Hz~~

2. 1293,77 Hz

3. 1293,07

→ FFT ergab $f_0 = 1293,63 \pm 0,07 \text{ Hz}$

~~Stahl~~ $E = 9,5616 \cdot 10^{10} \frac{\text{N}}{\text{m}^2} \pm 737179695,1$

~~Aluminium~~

$M = 1756,98 \text{ g} \pm 0,19$

$L = 130,3 \text{ cm}$

$D = 11,5 \text{ mm} + 0,46 \text{ mm} = 11,967 \text{ mm} \pm 0,002 \text{ mm}$

0,47 mm

0,465 mm

0,47 mm

0,47 mm

0,465 mm

Cassys

$$700 \mu\text{s} \cdot 16000 = 1600 \text{ ms}$$

$$v = f_0 \cdot 2L = 3363 \frac{\text{m}}{\text{s}}$$

→ FFT ergab $f_0 = 1883,38 \pm 2,11 \text{ Hz}$

$E = 1,05 \cdot 10^{11} \frac{\text{N}}{\text{m}^2} \pm 454759911,2$

~~Messing~~ $M = 1301,6 \text{ g}$

$L = 129,9 \text{ cm} \pm 0,1 \text{ cm}$

$D = 11,5 \text{ mm} + 0,46 \text{ mm} = 11,961 \text{ mm} \pm 0,001 \text{ mm}$

0,46 mm

0,46 mm

0,46 mm

0,465 mm

0,46 mm

→ FFT ergab $f_0 = 1512,86 \pm 0,28 \text{ Hz}$

$E = 1,3776 \cdot 10^{11} \frac{\text{N}}{\text{m}^2} \pm 120373194,9$

Aluminium: $m = 399,04 \text{ g}$ $L = 129,9 \text{ cm}$

$D = \cancel{14,8}$

$12 \text{ mm} + \cancel{0,16 \text{ mm}} = 12,06 \text{ mm} \pm 0,003 \text{ mm}$

\Rightarrow FFT ergab $f_0 = 1923,28 \pm 0,12 \text{ Hz}$

$$E = 6,713 \cdot 10^{10} \frac{\text{N}}{\text{m}^2} \pm 64335543,43$$

$0,05 \text{ mm}$

$0,07 \text{ mm}$

$0,06 \text{ mm}$

$0,065 \text{ mm}$

$0,06 \text{ mm}$

$0,06 \text{ mm}$

laser: $65,2 \text{ cm}$ $4: 51,9 \text{ cm}$ $9: 38,9 \text{ cm}$

$\#$ 1: $61,6 \text{ cm}$ 5: 49 cm

2: $58,2 \text{ cm}$ 6: $46,2 \text{ cm}$

3: $54,5 \text{ cm}$ 7: $43,6 \text{ cm}$

8: $41,2 \text{ cm}$

$$\Rightarrow \left(\frac{\sigma_E}{E} \right)^2 = \left(\frac{\sigma_L}{L} \right)^2 + \left(\frac{\sigma_m}{m} \right)^2 + \left(2 \frac{\sigma_F}{F} \right)^2 + \left(-2 \frac{\sigma_D}{D} \right)^2$$

$$\Rightarrow \sigma_E = E \sqrt{\left(\frac{\sigma_L}{L} \right)^2 + \left(\frac{\sigma_m}{m} \right)^2 + \left(2 \frac{\sigma_F}{F} \right)^2 + \left(-2 \frac{\sigma_D}{D} \right)^2}$$

$$\sigma_L = 0,001 \text{ m}$$

$$\sigma_m = \cancel{0,0001 \text{ kg}} \\ 0,00012 \text{ kg}$$

~~etc~~