

CZECH TECHNICAL UNIVERSITY IN PRAGUE		FACULTY OF TRANSPORTATION SCIENCES Department Of Applied Mathematics	
PHYSICS LABORATORY EXERCISES			
Name Name		Date of measurement 16.10.2018	
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Laboratory group number X		Evaluation	
Task number 00	Task title Measurement and processing of time and dimensions data		

A. Measurement and processing of time data

Measurement objectives

1. Carry out the measurement of pendulum swing using several methods. Determine the uncertainty for all measurement methods.

Specification of the task

1. Using the stop-watch, carry out the measurement of pendulum period T . Perform both single (1 period and 10 periods) and repeated measurement (1 period and sequential).
2. Determine the swing period and calculate its uncertainty
3. Carry out the PC controlled measurement and compare the obtained results.
4. Discuss the results.

Theoretical principle of the task

Describe the theory of the task briefly ...

Definition of all important quantities with units

Period T is a ... [s]

Swing time τ is a [s]

A short description of the measurement procedure

Take the stop-watch and carry out the measurement.

Use several method to determine the swing time (specify the methods briefly)

- One period as a single measurement
- 10 periods as a single measurement
- Repeated measurement of one period
- Sequential measurement of one period (10 data points)

A list of uncertainty calculation formulas

Copy the formulas from the "3rd_week.pdf"

Calculations

- clear general solution of the physical formulas
- precise values substitution and calculation of results with physical units

Determination of uncertainty

Use the formulas from the "3rd_week.pdf"

- clear general solution of the physical formulas
- precise values substitution and calculation of results with physical units

Conclusions

Compare the obtained results - determine the uncertainty ranges and check the position of the "true" value. Discuss the methods from the accuracy and precision point of view.

B. Measurement and processing of dimensions data

Measurement objectives

1. Carry out the measurement of dimensions of selected bodies and calculate their enclosed volumes and surface areas. Determine the uncertainty.

Specification of the task

1. Using the calliper or micrometre, carry out the measurement of dimensions of selected mass bodies.
2. Determine the body enclosed volume and surface area calculate the uncertainty.

Theoretical principle of the task

Describe the theory of the task briefly ...

Definition of all important quantities with units

The enclosed volume of a body V is a ... [m^3]

The surface area of a body S is a ... [m^2]

A short description of the measurement procedure

Take a calliper (micrometre) and carry out the measurement of body dimensions. Note that the all measurement has to be considered as repeated. In case the basic measurement error lies within the tool error, the measurement can be considered as single.

A list of uncertainty calculation formulas

Copy the formulas from the "3rd_week.pdf"

Calculations

- clear general solution of the physical formulas
- precise values substitution and calculation of results with physical units

Determination of uncertainty

Use the formulas from the "3rd_week.pdf"

- clear general solution of the physical formulas
- precise values substitution and calculation of results with physical units

Conclusions

Compare the obtained results - determine the uncertainty ranges. Discuss the results from the accuracy and precision point of view.