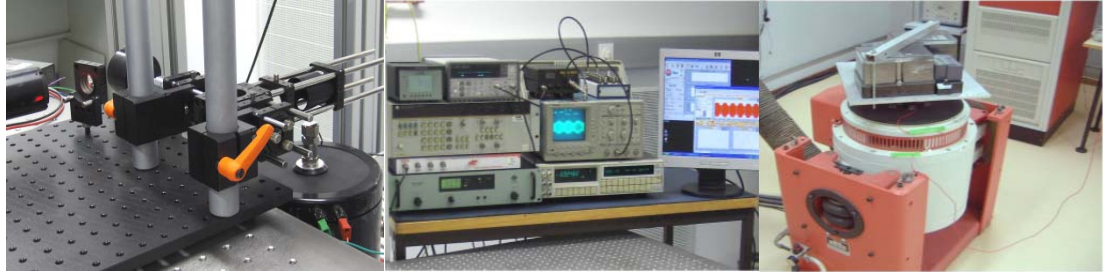


FIELD OF ACTIVITY



Homodyne Interferometer
for accelerometer calibration

Control and acquisition equipment

Vibration test

The Vibrations Laboratory has the mission to materialize, maintain and disseminate the units of acceleration, as well as the development and implementation of new methods and measurement capabilities.

In the frame of its activities has as its main concerns:

- Assure the traceability of vibration units allowing its dissemination in a national level;
- Participate and coordinate I&D and EURAMET projects and interlaboratory comparisons;
- Support technically the legal metrology.

This area is also engaged to carry out Vibration tests to study and estimate equipment characteristics in the electrical and mechanical mode of components and materials.

SI UNIT

International System Base Unit of vibration



The metre, symbol **m**, is the SI unit of length.

It is defined by taking the fixed numerical value of the speed of light in vacuum c to be 299 792 458 when expressed in the unit m s^{-1} , where the second is defined in terms of the caesium frequency $\Delta\nu_{\text{Cs}}$.

Derived Units

Acceleration: meter per second square (**a**) $\text{m} \cdot \text{s}^{-2}$

TRACEABILITY

Accelerometry

The implementation of an experimental system for absolute calibration of accelerometers by laser interferometry with homodyne detection ensures national traceability in this area.

This method is based mainly on sinusoidal excitation and a Michelson interferometer to determine the acceleration value in terms of maximum and minimum intensities in the optical signal.


The accelerometer sensitivity is estimate by the ratio of the voltage output of a charge amplifier and the acceleration amplitude.

The implemented method determines charge and voltage sensitivity of standard-accelerometers in the range between 40 Hz and 800 Hz with expanded uncertainties less than 1%.

Aiming to extend the measurement range for frequencies values of up to 2 kHz, is in full implementation a new method which appeals for the determination of the phase difference of the two limits of the displacement.



Calibration

EQUIPMENT	RANGE	UNCERTANTY	
Standard–Accelerometers – Charge Sensibility	40 Hz - 800 Hz	1 %	
Standard–Accelerometers – Voltage Sensibility			

Vibration Tests

Precursor of vibration tests applied to electronic equipment in Portugal has the capability to fit the needs of the industry and responding to the specifications and requirements of equipment. The technical capabilities are proficient to cover most of the requests defined by the most common international standards leading the matter (CEI 68 e MIL STD 810).

EXCITATION	MAXIMUM LOAD	MAXIMUM FORCE
Sinusoidal, random noise, half-sine: 5 Hz a 5 kHz	250 kg	6,7 kN

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