

LEMI-24 Apparatus of Forced Vibration and Resonance



- Obvious physical phenomenon
- Stable and reliable experimental data
- Rich experiment contents, easy operation and high measurement accuracy

Forced vibration and resonance are often used in engineering and scientific research. For example, in construction, machinery and other projects, it is often necessary to avoid resonance phenomenon to ensure the quality of the project. In some petrochemical enterprises, the liquid density and level height are detected online by using tuning-fork liquid density sensors and level sensors based on resonance phenomena.

This apparatus uses the tuning fork vibration system as the research object, uses the electromagnetic force of the excitation coils as the driving force and uses the coil as the amplitude sensor, to measure the relationship between the vibration amplitude and the frequency of driving force of the underlying vibration system, and to study the phenomenon of vibration and resonance and its laws. This apparatus can perform the following experiments:

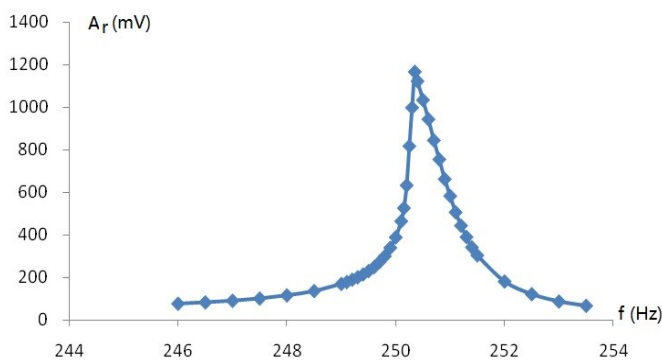
1. Study the relationship between amplitude and force frequency of a tuning fork vibration system drove by a periodically external force. Measure and plot their relationship curve, and acquire the resonance frequency and the sharpness of the vibration system (this value is equal to the Q value).
2. Measure the relationship between the vibration and the mass of symmetrical arms of the tuning fork. Acquire the relationship formula between the vibration frequency f (i.e. resonance frequency) and the block mass m attached to the tuning fork arms at a certain position.
3. Measure the mass of a pair of mass blocks attached to the tuning fork arms by measuring the resonance frequency.
4. Measure the resonance frequency and sharpness of the tuning fork when changing the vibration structure and increasing the damping force of the tuning fork and do comparison.

Specifications

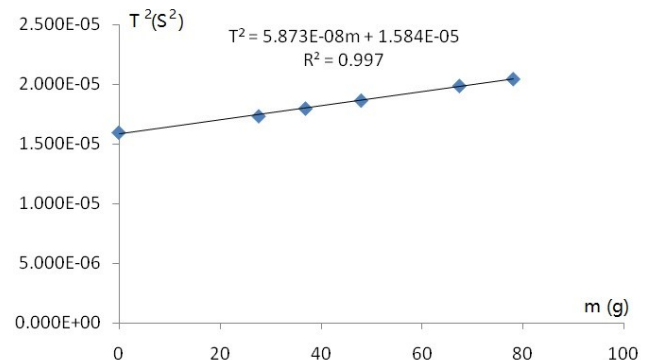
Description	Specifications
Tuning fork and support	dual arms, vibration frequency about 248 – 256 Hz (without loading)
Signal generator	frequency range 200 – 300 Hz adjustable
Frequency control & display	200 – 300 Hz, resolution 0.01 Hz
AC voltmeter	range 0 – 2000 mV, resolution 1 mV
Stainless steel damping sheet	dimensions 50 mm × 40 mm × 0.5 mm, 2 pieces, attached to two arms of tuning fork using small magnets respectively
Paired mass block	6 pairs of different masses
Tuning fork	driven and sensed by electromagnetic coils

Parts

Description	Qty	Note
Main electric unit	1	
Mechanical stage	1	
Mass block	6 pairs	different mass for each pair
Thin stainless plate	2	
Magnetic steel	2	diameter 18 mm, Neodymium magnet
BNC cable	4	
Allen wrench	1	
Power cord	1	
Instruction manual	1	



Relationship between amplitude and frequency



Relationship of square of resonance period and arm mass