
Electrical measuring instrument of the magnetoelectric system as an oscillator for laboratory study of mechanical vibrations and resonance

© I.N. Fetisov

Bauman Moscow State Technical University, Moscow, 105005, Russia

The article describes the training kit and laboratory techniques for quantitative studies of forced mechanical vibrations and resonance with the use of galvanometer or similar devices as torsional oscillator. The oscillator of the galvanometer fully corresponds to the classical problem of forced vibrations: variable force generated by alternating current of the generator varies harmonically and is applied directly to the inertial body and the dissipative resistance force is proportional to the velocity of the body. We show the results of the laboratory study of forced and intrinsic vibrations of the oscillator and prove that the described method of studying the vibrations has advantages over conventional methods.

Keywords: *mechanical vibrations, forced vibrations, resonance, galvanometer, a laboratory experiment.*

REFERENCES

- [1] Pol' R.V. *Mekhanika, akustika i uchenie o teplate* [Mechanics, acoustics, and heat]. Moscow, Nauka Publ., 1971, 480 p.
- [2] <http://www.rosuchpribor.ru/russian/prof/phys/koleb/fdk001.html> (accessed 08 March 2013).
- [3] Khaustova V.I. *Izuchenie vynuzhdennykh kolebanií maiatnika s dvizhushcheisia tochkoi podvesa: metod ukazaniia k vypolneniiu laboratornoi raboty M-13 po kursu obshchei fiziki* [Study of forced oscillations of a pendulum with a moving point of suspension: guidelines for laboratory work M-13 on general physics]. Moscow, Bauman MSTU Publ., 1990, 16 p.
- [4] Fetisov I.N. *Izuchenie mekhanicheskogo rezonansa s pomoshchyu gal'vanometra magnitoelektricheskoi sistemy* [Study of mechanical resonance with a galvanometer of magnetoelectric system]. *Sb. trudov XII Mezhdunarodnoi uchebno-metod. konf. «Sovremennyi fizicheskiiy praktikum»*. [Proc. XII Int. Method. Conf. "Modern physics practicum"]. Moscow, Moscow Phys. Soc. Publ., 2012, p. 121.
- [5] Fetisov I.N. *Fizicheskoe obrazovanie v vuzakh — Physics in Higher Education*, 2014, no. 1, pp. 63–65.
- [6] Vvedenskii B.A., Vul B.M., eds. *Fizicheskiiy entsiklopedicheskiiy slovar'* [Physical Encyclopedic Dictionary]. Vol. 3. Moscow, Sovetskaya Entsiklopediya Publ., 1963, 624 p.
- [7] Fetisov I.N. *Mekhanicheskiiy rezonans* [Mechanical resonance]. Moscow, Bauman MSTU Publ., 2013, 31 p.

Fetisov I. N. (b. 1931) graduated from Lomonosov Moscow State University, Physics Faculty in 1955. Ph.D., Assoc. Professor of the Physics Department in Bauman Moscow State Technical University. Research interests include biophysics of the vision, millimeter radio waves, experimental methods of physical measurements, laboratory session. e-mail: infetisov@mail.ru
