Electro-Acoustic System with Piezoelectric Sensor

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Piezoelectric transducers are widely used in electro-acoustic, hydroacoustic, ultrasonic, medical and measuring techniques, security and control systems. One of the main characteristics of the piezoelectric transducers is operation frequency band. Despite the fact that it is used to be expanded, narrowband piezoelectric transducers also can be used. In particular, the fields of application of piezoelectric transducers are narrowband alarm systems, for example, glass breakage detectors [1].

The use of acoustic resonator can increase the level of piezoelectric sensor output signal on the given frequency. Equivalent electric circuit of piezoelectric sensor with acoustic resonator due to electromechanical analogies method is shown in Fig. 1, where M_d, C_d, R_d are the acoustic mass, compliance and resistance of piezoelectric bimorph diaphragm; C_o is the piezoelectric transducer capacitance; M_1, R_1, C_V are the acoustic mass, resistance and compliance of acoustic resonator; Z is the load.

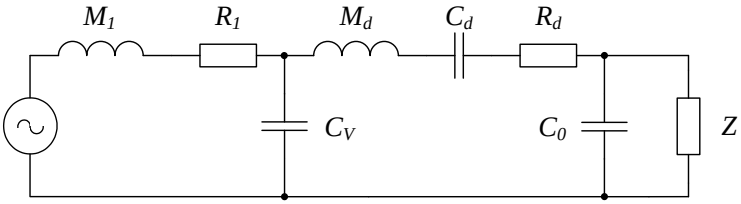

Fig. 1 – Equivalent electric circuit of piezoelectric sensor with acoustic resonator

The use of the offered equivalent circuit allows with the application of programs to assess characteristics, to predict the parameters and operation mode of piezoelectric transducers. Received information can be used in electro-acoustic transducers designing.

1. Sharapov V. *Piezoceramic sensors* (Springer Verlag: 2011).