Effect of Magnetic Field on Frequency Generated From an Active Magnetic Buzzer

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A magnetic buzzer is one of the most widely used electronic devices generating sound frequency. Generally, magnetic buzzers are categorized into two types, namely, passive and active. Active magnetic buzzers additionally contain circuits which contain inductors, enabling them to function given DC input. Our team observed a phenomenon such that when induced by external magnetic field, the generated frequency of the active magnetic buzzer changes with respect to both the magnitude and direction of the external magnetic field. Such phenomenon can be explained by several factors. On one hand, the external magnetic field can yield a change in resistance inside the circuit. On the other hand, magnetic force acting on ferromagnetic disk of the buzzer and parasitic capacitance in the circuit of the buzzer may also contribute to the occurrence of this phenomenon. In our research, a mathematical model is constructed to describe the frequency generated from an active magnetic buzzer that experiences the external magnetic field B. To confirm the theoretical approach, experiments were conducted by placing 5V Electromagnetic Active Buzzer between Helmholtz coil and adjusting magnetic field strength from 0 to 3 mT. Vernier Magnetic Sensor and Vernier Microphone are used to detect magnetic field strength and generated frequency. After comparison of theoretical description and experimental results, the mathematical model is verified by the results of generated frequency from the buzzer with respect to both the magnitude and direction of magnetic field. The applications of this research are varied in the field of electronic device designing.

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