

Potential Use of a Vibration Energy Harvester in Vehicles Using a Linear Motion Electromagnetic Suspension System (Book Chapter)

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Abstract:

Vibration energy is one type of abundant energy that can be harvested from a vehicle. The vehicle vibrates due to many reasons such as worn-out parts and joints, or it will vibrate due to engine and transmission vibration. In recent years, several new methods of energy intake have been proposed for vehicle suspensions such as to use the linear electromagnetic energy vibrations. The kinetic energy of the linear motion of a harvest suspension system is converted into electrical energy by a magnetic generator, which generally consists of a set of magnets and coils. The current in the coil is created by the relative movement between the magnets and the coils. Therefore, maximizing the magnetic flux density through the coils is a key element to obtain good regeneration of electrical energy. This article presents the different types of vibration linear electromagnetic energy harvesters used in vehicle suspension systems and the potential use of them. The design and working principle of the linear energy harvesters are explained and discussed. It is concluded that the hybrid linear electromagnetic energy harvester is the most viable when applied to vehicle suspensions because of the higher power generated if compared to other energy harvesters.

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