Contribution ID: **1122** Type: **Poster Presentation of 1h45m**

Induced Voltage Characteristics by Back-Iron Effect for Electromagnetic Energy Harvester Using Magnetic Fluid

Tuesday 29 August 2017 13:15 (1h 45m)

Energy harvesting refers to a process that derives a small amount of power from external energy sources. The energy sources of harvesters can be easily obtained anywhere from vibration, wind power and wave power. In this study, we will focus on vibration, one of the typical energy sources that can be easily changed into an electromotive force (EMF), as our study subject. Mechanical vibration is highly attractive as an energy source because it is readily available around us. Vibration energy can be converted into electric energy via the following methods: piezoelectric, electrostatic, and electromagnetic transduction. On the other hand, an electro-magnetic energy harvester using a magnetic fluid can be utilized with vibrations of a low frequency. A magnetic fluid is a colloidal fluid produced by a nanoscale permanent magnet dipole. The shape of a magnetic fluid can be freely changed so that an EMF can be produced even with a small vibration. Since the magnetic fluid has fluidic and magnetic properties, as found in soft ferromagnetic substances, it can be often employed in energy harvesters. In contrast with existing harvesters using permanent-magnet vibration, the harvester proposed in this study used a sloshing phenomenon of the magnetic fluid to change the amount of magnetic flux interlinked at the coil. The sloshing phenomenon can also be seen in the small vibration at a low frequency. This movement generates an EMF by changing the amount of magnetic flux interlinked at the coil. In this study, two types of electro-magnetic energy harvesters were built to compare the induced EMF. One used an air yoke, which returned the magnetic flux of the permanent magnet back to the air, and the other used a back-iron yoke consisting of a ferromagnetic material which reduced the magnetic resistance of a magnetic circuit.

Submitters Country

South Korea

Authors: KIM, Young Sun (Joongbu University); Mr LEE, Kang Won (Joongbu University)

Presenter: Mr LEE, Kang Won (Joongbu University)

Session Classification: Tue-Af-Po2.12

Track Classification: H3 - Other Associated Technologies