

Development and Characterization of Acoustic Energy Harvesters for Low Power Wireless Sensor Network

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Abstract : Wireless Sensor Nodes (WSNs) have developed significantly over the years and have significant potential in diverse applications in the fields of science and technology. The inadequate energy accompanying WSNs is a key constraint of WSN skills. To overcome this main restraint, the development and expansion of effective and reliable energy harvesting systems for WSN atmospheres are being discovered. In this research, low-power acoustic energy harvesters are designed and developed by applying different techniques of energy transduction from the sound available in the surroundings. Three acoustic energy harvesters were developed based on the piezoelectric phenomenon, electromagnetic transduction, and hybrid, respectively. The CAD modelling, lumped modelling and Finite Element Analysis of the harvesters were carried out. The voltages were obtained using FEA for each Acoustic Harvester. Characterization of all three harvesters was carried out and the power generated by the piezoelectric harvester, electromagnetic harvester and Hybrid Acoustic Energy harvester are $2.25 \times 10^{-9}W$, $0.0533W$ and $0.0232W$, respectively.

Keywords : energy harvesting, WSNs, piezoelectric, electromagnetic, power

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