MS18-P14 | NEW METHOD FOR ELECTROMECHANICAL LOSSES EVALUATION OF THE ELECTROSTRICTIVE ENERGY EFFICIENCY: EXPERIMENTS AND MODELING

Farhan, Rida (Faculty of Sciences Ben M'Sik Hassan II University, Casablanca, Morocco, Casablanca, MAR)

Converting vibrations to a practical form of energy have been the subject of many late surveys. The concluding purpose is to convert ambient vibrations to achieve low-power consumption devices, such as microelectromechanical systems and wireless sensors, which have restricted existence duration that would need costly maintenance. The techniques used to convert vibrations into electrical energy comprise: piezoelectric elements, electromagnetic devices or electrostatic systems. Electroactive polymers have been most used as smart material for sensing in last year's. Electromechanical applications are actually concentrated on energy harvesting, including the development of wireless portable electronic equipment autonomous and specific actuators such as artificial muscles. The aim of this work is the identification of electromechanical conversion losses by electrostrictive polymers using the Fast Fourier Transform (FFT) analysis. These losses are due mainly to the variation of the electrical and mechanical parameters exciting the electrostrictive polymer. In order to estimate this dissipated energy, an evaluation by FFT has been performed. In this context, an analytical model will be detailed and the theoretical results will be compared with the experimental results. Good agreement have been found between the two approaches.

Keywords: Electrostrictive polymer, electromechanical losses, FFT analysis, energy conversion