Experimental Investigation of Piezoelectric Energy Harvesting System

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ABSTRACT

The process of acquiring the energy surrounding a system and converting it into usable electrical energy is termed power harvesting. Piezoelectric materials have a crystalline structure that provides term with the ability to transform mechanical strain energy into electrical charge, vice versa, to convert an applied electrical potential into mechanical strain. The use of piezoelectric materials to capitalize on ambient vibrations surrounding a system is one method that calls the piezoelectric power harvesting. The purpose of this thesis is to make a study of characteristics of piezoelectric power harvesting. Points of this thesis are: analyzing and forecasting of characteristics of the piezoelectric materials electric power, design the parameters of piezoelectric power harvesting, design the structure of piezoelectric power harvesting and observe the influence of the parameters: (1). Apply force range, (2). The site of the structure that piezoelectric element plaster, (3). The type of piezoelectric element (monolithic piezoelectric with tradition electrode composite, interdigitated electrodes and monolithic piezoelectric composite and Macro-fiber composite), (4). Apply force model (harmonic oscillations and random noise) on the characteristic of piezoelectric energy harvesting system (transformable voltage, current and power) by experimental measurement. Key Words: power harvesting, piezoelectric

Keywords : power harvesting, piezoelectric ; monolithic piezoelectric with interdigitated electrodes composite ; Macro-fiber composite

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