

عنوان مقاله:

Investigating of Energy Harvesting by Piezoelectric Stack from Movements and Vibrations of Body Muscles

محل انتشار:

کنفرانس دو سالانه بین المللی مکانیک جامدات تجربی (سال: 1392)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

In the current study, harvested energy from a piezoelectric device which runs by movements of body muscles was analyzed by finite element method. A piezoelectric stack, which is transducer of mechanical energy to electrical energy, could be placed inside of body and transforms displacement energy of ribs movement to electrical energy. This electrical energy could be applied in treatment of internal injuries of body, provide required energy for heart batteries used in pacemakers. Using finite element software, Abaquse with its novel capabilities in the piezoelectric field, makes this kind of analysis available. After designing and creation of finite element model of the piezoelectric stack in the software, the harmonic displacements of ribs which generated by breathing process are applied as boundary conditions to the finite element model. Then by performing harmonic analyses, the produced voltage and electrical energy are extracted from output results. Finally, The results are sentenced based on physiologic condition of body and produced voltage and electrical energy. The results show that the piezoelectric stack can produce enough electrical energy for low power consuming devices such as pacemaker.

کلمات کلیدی:

Energy harvesting; Piezoelectric stack; Finite element method; Muscle vibration

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<https://civilica.com/doc/263968>

