عنوان مقاله:

An Investigation into Resonant Frequency of Triangular V-Shaped Cantilever Piezoelectric Vibration Energy Harvester

محل انتشار:

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خلاصه مقاله:

Power supply is a bottle-neck problem of wireless micro-sensors, especially where the replacement of batteries is impossible or inconvenient. Now piezoelectric material is being used to harvest vibration energy for self-powered sensors. However, the geometry of a piezoelectric cantilever beam will greatly affect its vibration energy harvesting ability. This paper deduces a remarkably precise analytical formula for calculating the fundamental resonant frequency of V-shaped cantilevers using Rayleigh-Ritz method. This analytical formula, which is very convenient for mechanical energy harvester design based on Piezoelectric effect, is then validated by ABAQUS simulation. This formula raises a new perspective that, among all the V-shaped cantilevers and in comparison with rectangular one, the simplest tapered cantilever can lead to maximum resonant frequency and highest sensitivity.

کلمات کلیدی:

Mechanical energy harvester, Piezoelectric, V-shaped cantilever, Resonant frequency, Finite Element