عنوان مقاله:

Vibrational Energy Harvesting from a Monostable Pie-zomagnetoelastic Structure with Multi-frequency Exci-tation

محل انتشار:

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خلاصه مقاله:

The present article proposes the idea of multi-frequency excitation to harvest energy from ambient low-frequency vibrations. The nonlinear piezomagnetoelastic set-up, operating in the monostable mode, is considered. Since low-frequency vibrations are often dominant in the ambient, it is vital to design harvesters with natural frequencies close to these ambient vibra-tions. On the other hand, due to small size of most harvesters, their fundamental frequency is often larger than frequencies available in the ambient. To overcome this challenge, we pro-pose the idea of multi-frequency excitation and employing secondary resonances such as combination and simultaneous resonances, occurring in nonlinear systems. Nonlinear differ-ential equations governing the harvester dynamics are solved using the direct harmonic bal-ance method. Numerical results are presented for a real energy harvester subjected to a dual-frequency excitation. It is found out that multi-frequency excitation and exploiting combina-tion and simultaneous resonance result in significant enhancement in the harvester output voltage and power. It is also found out that the simultaneous resonance is more effective in improving the harvester performance compared to the combination resonance

کلمات کلیدی:

.Energy harvesting; multifrequency excitation; nonlinear dynamics; piezomagne-toelastic

لینک ثابت مقاله در پایگاه سیویلیکا: