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Non-linear energy harvesting from coupled impacting beams

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Highlights

- A coupled two beam system with non-linearity from impact and asymmetry is used to improve the energy harvested.
- The influence of different system parameters, such as contact stiffness, clearance and asymmetry on the energy harvested was identified.
- The power generated depends on the number of close modes within the bandwidth of excitation of the non-linear impact.
- The asymmetry of the close mode shapes and the frequency spacing alters the power generated.

Abstract

Energy harvesting has many potential applications for structures with broadband excitation, such as aircraft noise and low frequency vibrations from human motion. The advantage with a vibro-impacting system is the capability of converting low frequency response to high frequencies. A coupled beam system is base excited and the influence of different system parameters are studied. Exciting the system at a single resonant frequency highlights the influence of clearance and base excitation