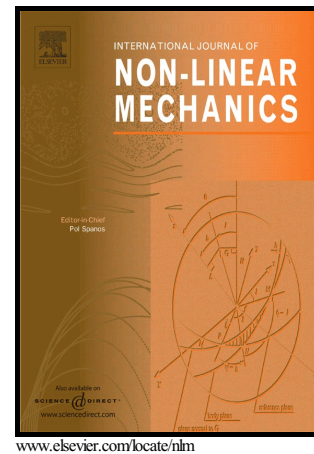


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1 Dynamics of two vibro-impact nonlinear energy sinks in 2 parallel under periodic and transient excitations

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8 **Abstract**

9 A linear oscillator (LO) coupled with two vibro-impact (VI) nonlinear energy
10 sinks (NES) in parallel is studied under periodic and transient excitations, respec-
11 tively. The objective is to study response regimes and to compare their efficiency
12 of vibration control. Through the analytical study with multiple scales method,
13 two slow invariant manifolds (SIM) are obtained for two VI NES, and different
14 SIM that result from different clearances analytically supports the principle of
15 separate activation. In addition, fixed points are calculated and their positions are
16 applied to judge response regimes. Transient responses and modulated responses
17 can be further explained. By this way, all analysis is around the most efficient
18 response regime. Then, numerical results demonstrate two typical responses and
19 validate the effectiveness of analytical prediction. Finally, basic response regimes
20 are experimentally observed and analyzed, and they can well explain the com-
21 plicated variation of responses and their corresponding efficiency, not only for
22 periodic excitations with a fixed frequency or a range of frequency, but also for
23 transient excitation. Generally, vibration control is more effective when VI NES
24 is activated with two impacts per cycle, whatever the types of excitation and the

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