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# Experimental results on the vibratory energy exchanges between a linear system and a chain of nonlinear oscillators

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## Abstract

Experimental results on a nonlinear chain coupled to a main system are presented. The chain is composed of eight moving masses, each one possesses local nonlinear **restoring** forcing function and global linear springs for coupling to other masses. The main system is coupled to the first mass of the chain via a linear spring. The main system is under external sinusoidal excitation with sweeping frequency around its targeted mode. Experimental results show that according to the amplitude of the excitation, the system can reach periodic or modulated regimes. The goal of using the nonlinear chain is to examine experimentally the possibility of localization of the vibratory energy of the main system into the chain for the aim of passive control.

*Keywords:* experimental study, passive control, localization, nonlinear chain, strongly modulated response, periodic regime

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## 1. Introduction

The use of additional nonlinear devices has shown its efficiency in terms of passive control of primary structures [1]. Indeed, essential nonlinearity enables secondary systems such as Nonlinear Energy Sink (NES) [2, 3, 4] to enter into resonance with any frequency, allowing a broadband control. **Studying nonlinear interactions between nonlinear oscillators in general and multiple NES**

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