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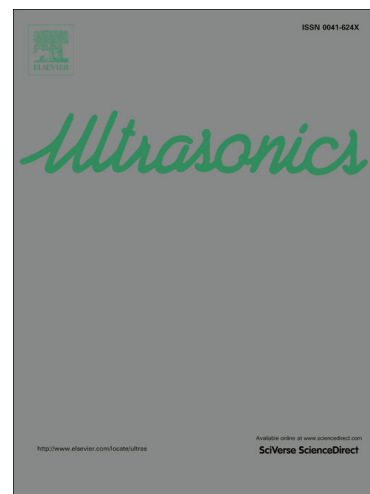
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# Effects of experimental configuration on the detection threshold of hysteretic elastic nonlinearity

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## Abstract

Nonlinear elastic signature of granular consolidated or damaged media is often very small and might easily fall within the noise level. Therefore, it is important to determine an excitation amplitude threshold above which nonlinear measurements start to be meaningful. In this paper, we analyse the way this threshold is influenced by some parameters of the experimental configuration, such as the receiver position, and of the data analysis, such as the considered reference amplitude. Furthermore, this contribution shows that extracting absolute values of the nonlinear parameters often requires the a priori knowledge of the resonance structure of the medium.

*Keywords:* hysteretic nonlinearity, nonlinearity threshold, noise, frequency analysis, time domain analysis

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## 1. Introduction

Beyond a dynamic strain, the acoustic response of micro-inhomogeneous / micro-cracked media to an external excitation contains a signature of their

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