## Approximation Errors and Model Reduction with an Application on Damage

## Identification

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Intending Model reduction is required in several different applications in which we need to handle limited available time and lack of computer memory resources. In Damage Identification problems the use of full accurate models for the inverse problem may lead to prohibitive costs. Conversely, the use of less accurate models for the inverse problem may lead to misleading results. In this paper we present a methodology for model-based Damage Identification problems using reduced/approximate models which takes into account modeling errors as random variables. The model uncertainties are treated with the Approximation Error Approach theory. The effectiveness of this methodology is assessed with a set of numerical examples considering: limited amount of measured information, noise-corrupted signals, changes in the frequency spectrum of excitation, multiple damaged scenarios.

Keywords: Approximation Error Approach, Damage Identification, Uncertainties, Continuum

Damage Model