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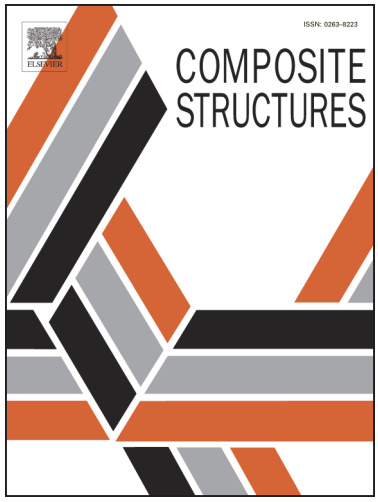

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Samy Missoum, Sylvain Lacaze, Marco Amabili, Farbod Alijani

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Identification of Material Properties of Composite Sandwich Panels under Geometric Uncertainty

Samy Missoum* and Sylvain Lacaze

Aerospace and Mechanical Engineering Department
University of Arizona, Tucson, Arizona, USA

Marco Amabili

Department of Mechanical Engineering
McGill University, Montréal, Québec, Canada

Farbod Alijani

Department of Precision and Microsystems Engineering
TU Delft, The Netherlands

Abstract

This study deals with the influence of manufacturing-induced geometric variability on the identification of material properties of composite sandwich panels. The objective of this article is two-fold. First, this work aims to demonstrate the marked influence of geometric uncertainties on a foam core sandwich panel whose skin material properties need to be identified. Several identification cases are studied based on experimentally obtained natural frequencies and mode shapes. The second objective is to propose a numerical method for the identification process in the case where uncertainties can be treated as a random field (e.g., thickness distribution). The identification method is built around a classification-based technique referred to as "fidelity maps", which has the ability to simultaneously treat several responses to match without any assumption on their correlation. The approach uses a proper orthogonal decomposition for the extraction and the selection of the features of the random field considered as important for the identification. The identification method is demonstrated

*Corresponding author

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