

Preface

Topics in Nonlinear Dynamics represents one of seven volumes of technical papers presented at the 31st IMAC, A Conference and Exposition on Structural Dynamics, 2013 organized by the Society for Experimental Mechanics, and held in Garden Grove, California February 11–14, 2013. The full proceedings also include volumes on Experimental Dynamics Substructuring; Dynamics of Bridges; Dynamics of Civil Structures; Model Validation and Uncertainty Quantification; Special Topics in Structural Dynamics; and, Modal Analysis.

Each collection presents early findings from experimental and computational investigations on an important area within Structural Dynamics. Nonlinearity is one of these areas.

The vast majority of real engineering structures behave nonlinearly. Therefore, it is necessary to include nonlinear effects in all the steps of the engineering design: in the experimental analysis tools (so that the nonlinear parameters can be correctly *identified*) and in the mathematical and numerical models of the structure (in order to run accurate *simulations*). In so doing, it will be possible to create a model representative of the reality which (once *validated*) can be used for better predictions.

Several nonlinear sessions will address theoretical and numerical aspects of nonlinear dynamics (covering rigorous theoretical formulations and robust computational algorithms) as well as experimental techniques and analysis methods. There are papers dedicated to nonlinearity in practice where real-life examples of nonlinear structures will be discussed. Finally, a number of papers will discuss an interesting shift in paradigm: nonlinearities are not always detrimental, but instead they can be exploited for better engineering designs.

The organizers would like to thank the authors, presenters, session organizers, and session chairs for their participation in this track.

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