Preface to the special issue NODYCON 2021, Second International Nonlinear Dynamics Conference, Feb. 16–19, 2021

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This Special Issue is a collection of some invited contributions presented at the Second International Nonlinear Dynamics Conference (NODYCON 2021, February 16–19, 2021). NODYCON was launched in 2019 as a biennial conference to foster the tradition of the conference series originally established by Prof. Ali H. Nayfeh in 1986 at Virginia Tech, Blacksburg, as the Nonlinear Vibrations, Stability and Dynamics of Structures Conference. With the passing in 2017 of

Prof. Nayfeh, NODYCON 2019 was also organized as a collective tribute to Prof. Nayfeh. NODYCON 2019 received an extraordinary response from the community with 408 abstracts (out of 450 submissions) and 400 participants from 68 countries. After the successful launch, NODYCON 2021 was hosted as a virtual (online) conference given the COVID-19 pandemic uncertainties and restrictions. The NODYCON 2021 online conference featured 442 oral presentations covering recent advances in nonlinear dynamics, including new frontiers and challenges.

The authors of a selection of approximately 60 papers were invited to submit their work to this Special Issue. After a rigorous review process, 19 papers were accepted. These papers are grouped according to four major themes:

- Concepts and methods in nonlinear dynamics
- Nonlinear dynamics of mechanical and structural systems
- Nonlinear dynamics and control
- Recent trends in nonlinear dynamics

The first topical area titled *Concepts and methods in nonlinear dynamics* includes articles concerning the computation of invariant manifolds in high-dimensional finite element models [1], the computation of the basins of attraction of multi-stable dynamical systems [2], reduced-order models for vertical sloshing employing neural networks [3], the problem of continuous representations of piecewise-smooth

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nonlinear systems [4], and analytical approaches to nonlinear singular traveling waves in compressible thermo-hyperelastic cylindrical shells [5].

Articles on the fundamental problem of slipping-rolling transitions of a body with two contact points [6], a base-isolated beam under turbulent wind flow [7], analysis of cable-stayed bridges accounting for support stiffness [8], the response of continuous wing-based systems [9] are included in the context of *Nonlinear dynamics of mechanical and structural systems*.

Articles in the context of *Nonlinear dynamics and control* include grazing-induced multi-stable responses in impacting systems via time-delayed feedback control [10], position control of an elastic arm with delay-induced bifurcations [11], nonlinear control of an absorption refrigeration system [12], vibration transmission suppression in coupled systems with an inerter-based nonlinear joint [13], tuned inerter dampers [14], and vibration isolation [15].

Recent trends in nonlinear dynamics is a collection of emerging topics tackling parametric resonance and pattern selection in MEMS [16], the effect of uncertainties and noise on the response of microcantilevers [17], enhanced sensitivity of measurements by virtually coupling a resonator with a virtual resonator [18], highly tunable vibration isolation devices exploiting negative stiffness and shape memory material hysteresis [19].

We wish to thank all the authors for their hard work and enthusiasm. We hope that readers will benefit from the diverse collection of papers in this SI and that these papers will inspire new ideas and exciting developments.

Guest Editors of the Special Issue.

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Recent trends in nonlinear dynamics

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