



PREFACE
SPECIAL ISSUE ON STRUCTURAL DYNAMICAL SYSTEMS

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“SDS - Structural Dynamical Systems” is a series of meetings established in 2001. Aim of the series is to bring together researchers in the fields of mathematics and engineering and give them the opportunity to exchange ideas and discuss recent findings in theoretical and computational aspects of dynamical systems and their applications.

Traditionally, it is a biennial event that takes place in Puglia (Southern Italy) in late Spring, whose distinctive features are a high scientific quality, a friendly, relaxed, atmosphere, and a strong sense of community.

The 11th edition of this series should have taken place in 2020, when the world was hit by the covid-19 pandemic, which forced its cancellation. Goal of this special issue is to collect part of the scientific progress that was meant to be shared during the canceled edition.

The special issue contains 13 articles of high scientific quality on topics that extend from computational methods in ODEs, DDEs, PDEs and stochastic dynamical systems to mathematical models in biology, earth science and computer animation. Ascher, Larionov, Sheen and Pai in [1] examine numerical methods for dynamical systems that arise in the context of simulations of deformable objects. Berardi and Difonzo propose in [2] a numerical scheme for the solution of Richards’ equation under Kirchhoff transformation. Blanes, Casas and Escorihuela-Tomàs, in [3], investigate the applicability of splitting methods with complex coefficients for the numerical solution of time-dependent Schrödinger equations. Breda, Liessi and Vermiglio in [4] study the problem of how to appropriately select the discretization grid for monodromy operators of DDEs. D’Ambrosio and Di Giovacchino, in [5], are concerned with the numerical preservation of relevant features of stochastic dynamical systems under discretization by ϑ -methods. Juma, Dehmelt, Portet and Madzvamuse, in [6], propose and study a mathematical model for cell contraction dynamics. Kirsten, in [7], studies the efficient numerical solution of systems of semilinear PDEs via model reduction. Lactignola, Frittelli, Cusimano and De Gaetano, in [8], study a mathematical model for the formation of sea urchins. Manzini

and Mazzia, in [9], generalize to polygonal meshes, within the framework of virtual elements methods, the Scott-Vogelius finite element method for the 2D Stokes problem. Messina, Pezzella and Vecchio, in [10], propose and study a non-standard numerical scheme for the integro-differential equation given by the Kermack and McKendrick age-of-infection epidemic model. In [11], van den Berg, Duchesne and Lessard prove the existence of rotation invariant patterns for a nonlinear Laplace-Beltrami equation on the 2-sphere through a rigorous computational approach based on Taylor-Chebyshev expansions. In [12], Viviani, through the analysis of algebraic properties of the 2D Euler equations, proposes a theory for the spontaneous formation of zonal jets on spherical domains. In [13], Zanna introduces and studies a family of symplectic Runge–Kutta methods that is particularly suited to highly oscillatory problems.

We wish to thank all authors and reviewers for making this special issue possible, and express our sincere gratitude to the Editor-in-Chief, Robert McLachlan, and the whole editorial office of the Journal of Computational Dynamics for being so supportive during the preparation of this issue.

Sincerely.

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