

PREFACE:
**SPECIAL ISSUE ON NONLINEAR DIFFERENTIAL PROBLEMS
ON FLAT AND CURVED STRUCTURES: VARIATIONAL AND
TOPOLOGICAL METHODS**

This special issue follows the associated Special Session SS105 of the same name at the 14th AIMS Conference on Dynamical Systems, Differential Equations and Applications in Abu Dhabi, United Arab Emirates (held on December 16–20, 2024). The session focused on the qualitative analysis of nonlinear differential problems on Euclidean and non-Euclidean spaces. In particular, the main purpose was to give an update on recent developments concerning ordinary and partial differential equations, variational-hemivariational inequalities, difference equations, and algebraic systems obtained by exploiting different methods of nonlinear analysis, such as critical point theory, fixed point theorems, topological degree, Morse theory, set-valued analysis, optimal mass transportation, and so on.

We would like to thank all the authors for their valuable scientific contributions and all our colleagues for their support and cooperation, without which we could not have produced this volume.

In addition, we would like to thank Professor Xiaoying Han and Professor Alain Miranville, Editors-in-Chief of DCDS-S, for their support in carrying out the special issue.

Overall, this special issue contains 14 research papers:

- [1] A.M. Acu, M.-S. Sorea, A. Travaglini, G. Vinti, *Nonlinear multivariate sampling Durrmeyer operators: convergence results and applications*,
- [2] E. Amoroso, *Parametric double phase problems with mixed boundary conditions and possible critical growth*,
- [3] Y. Bai, N.S. Papageorgiou, S. Zeng, *Degenerate singular equations with sign changing reaction*,
- [4] P. Candito, G. Failla, *Positive solutions for parametric singular $p(x)$ -Laplacian problems*,
- [5] S. Carl, *Variational inequalities with gradient-dependent lower order terms in variable exponent homogeneous Sobolev spaces*,
- [6] J.P.P. Da Silva, G. Failla, L. Gasiński, N.S. Papageorgiou, *Equations with unbalanced growth and logistic type reaction*,
- [7] F.G. Düzgün, M. Marras, S. Vernier-Piro, *A class of fourth-order parabolic systems with time dependent coefficients with blow-up solutions*,
- [8] C. Farkas, S. Kajántó, *Higher-order Sobolev and Rellich inequalities via iterated Talenti's principle*,
- [9] L. Fresse, V.V. Motreanu, *Characterization of the kernels of trace operators on weighted Sobolev spaces*,
- [10] M. Ilina, A. Rațiu, *Evolution equations associated with positive linear operators*,
- [11] R. Livrea, D. Motreanu, A. Sciammetta, *Quasi-linear elliptic systems with intrinsic operators*,

- [12] V. Morabito, *Nonlinear Neumann problems with logarithmic double phase operator*,
- [13] L. Rinelli, A. Travaglini, N. Vescera, G. Vinti, *Sampling type operators versus AI in medical image processing*,
- [14] Z. Zhong, C. Li, F. Vetro, V.T. Nguyen, *A new kind of double phase differential inclusion problem with non-monotone operator and mixed boundary conditions*.

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