Preface

We are very pleased to present this special issue in *Matemática Contemporânea*. This volume brings together works that were presented at the ICMC Summer Meeting on Differential Equations–2022 Chapter, held at the Instituto de Ciências Matemáticas e de Computação (ICMC) from University of São Paulo (USP) at São Carlos, Brazil, from January 31 to February 02, 2022. The ICMC Summer Meeting on Differential Equations is an annual scientific meeting organized every year at the ICMC/USP–São Carlos since 1996. This event, which consists of lecturers, communications and panels, promotes interaction and collaboration among different research groups in differential equations from Brazil and other countries.

The call for papers was made by the ICMC Summer Meeting scientific committee, at the invitation of Professor Jaqueline Mesquita, editor-in-chief of Matemática Contemporânea.

This special issue contains eight articles in Differential Equations. More precisely, four articles are in the area of Linear Equations, one article is in the area of Elliptic Equations, one article is in Integral and Functional Differential Equations, one article is in Conservation Laws and Transport Equations and one article is in Free Boundaries Problems and Related Topics.

Concerning the papers in the area of Linear Equations, the author A. Parmeggiani presents a survey on hypoellipticity and subelliptic estimates for sums of square operators. The paper presented by S. Federico gives an overview of some results dealing with variable coefficient Schrödinger operators on $\mathbb{R} \times \mathbb{R}^n$ and $\mathbb{R} \times \mathbb{T}^2$, where $\mathbb{T}^2$ is the two dimensional torus. In the paper by G. Mendoza, it is introduced some sequences of vector bundles and first–order differential operators between them that are not complexes. On the other hand, W. Cerniauskas et al., investigate the solvability near the characteristic set of equations in the form $Lu = pu + f$ where the operator $L = \partial_t + (x^n a(x) + ixb(x))\partial_x$ is defined on $\Omega = \mathbb{R} \times S^1$, a and b are real–valued smooth functions on $\mathbb{R}$, with $b(0) \neq 0$, $n \in \mathbb{N}$, and $p, f \in C^\infty(\Omega)$.

The article in Elliptic Equations, by A. Molino and S. León, exhibits a study of a version of the well known Gelfand problem, to the 1-Laplacian operator.

The article in Free Boundaries Problems and Related Topics, by D. Danielli and A. Haj Ali, is a survey on the theory of obstacle-type problems involving fourth-order elliptic operators.

The paper by T. Faria gives an overview of some recent results for positive solutions of a non-autonomous Nicholson-type differential equations with multiple pairs of time-varying delays.

The paper in Conservation Laws and Transport Equations, by A. Simas and F. Valentim, is a survey that investigates a generalization of Laplace operator and study the homogenization's problem, under minor assumptions regarding weak convergence and ellipticity conditions.

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Editorial Board
Everaldo de Mello Bonotto
Alexandre Nolasco de Carvalho
Ederson Moreira dos Santos
Paulo Leandro Dattori da Silva
Sérgio Henrique Monari Soares

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Contributed papers

- On Kohn's sums of squares of complex vector fields,
  Alberto Parmeggiani.

- On some variable coefficient Schrödinger operators on $\mathbb{R} \times \mathbb{R}^n$ and $\mathbb{R} \times \mathbb{T}^2$,
  Serena Federico.

- Almost elliptic structures,
  Gerardo A. Mendoza.

- Semiglobal solvability for a class of first order operators,
  W. A. Cerniauskas, P. L. Dattori da Silva and A. Kirilov.

- Summary of "Gelfand–type problems involving the 1–Laplacian operator",
  Alexis Molino and Sergio Segura de León.

- A survey on obstacle-type problems for fourth order elliptic operators,
  Donatella Danielli and Alaa Haj Ali.

- Stability and periodic solutions for Nicholson equations with mixed monotone terms,
  Teresa Faria.

- Homogenization of a Generalized Second-Order Differential Operator,
  Alexandre B. Simas and Fábio J. Valentim.