

Preface

J. V. Cardoso ¹, **P. Cerda** ², **L. Iturriaga** ³, **J. M. do
Ó** ⁴ and **D. Pereira** ⁵

¹Universidade Federal de Sergipe, Departamento de Matemática, São
Cristóvão-SE, 49100-000, Brazil

²Universidad de Santiago de Chile, Departamento de Matemática y C. C.
Casilla 307, Correo 2, Santiago, Chile

³Universidad Técnica Federico Santa María, Departamento de Matemática,
Casilla 110-V, Valparaíso, Chile

⁴Universidade Federal da Paraíba, Centro de Ciências Exatas e da Natureza,
Departamento de Matemática - Campus Universitário, 58051-900

⁵Universidade Federal de Campina Grande, Unidade Acadêmica de
Matemática, Campina Grande 58429-900, Brazil

This is a special issue of *Matemática Contemporânea* in honor of Professor Pedro Ubilla on the occasion of his 60th birthday for his mathematical career and his great collaboration with the scientific community of Brazil and Chile. This is evidenced through participation in conferences, post-graduate review commissions, and the publication of 50 articles in collaboration with prominent Brazilian mathematicians. His line of research is in the area of elliptic PDEs by topological and variational methods, where he developed relevant techniques to study the existence of solutions for problems with concave-convex nonlinearities. He also developed an interesting technique for determining the existence of problems without variational structure. This volume collects some lectures at the 2021 USACH Webinar on Nonlinear Analysis and Elliptic Partial Equations In Honor of

the 60th birthday of Pedro Ubilla, 6 to 9 April, 2021. Organized by the Universidad de Santiago de Chile. In this volume, we have eight papers on Nonlinear Elliptic Problems and Differential Equations, which have been related to the main subject of Pedro Ubilla's research work.

The paper presented by Manassés de Souza Uberlandio Batista Severo and Thiago Luiz O. do Rêgo investigated the existence of the ground state and nodal solutions for a class of nonlinear scalar field equations defined on the whole real line involving the $1/2$ -Laplacian operator and nonlinearities with subcritical and critical growth in the sense of the Trudinger-Moser inequality. Eugenio Massa presented a paper with a collection of results dealing with positive solutions for some classes of elliptic problems involving nonlinearities with zeros. The paper of Justino Sánchez has a construction of self-similar solutions of the k -Hessian evolution equations. Edjane dos Santos and Uberlandio Severo, by using Orlicz spaces and variational methods, presented a paper on a class of quasilinear Schrödinger systems involving critical exponential growth. Gustavo Costa and Giovany Figueiredo studied the existence and concentration of ground state solutions for a class of quasilinear problems with steep potential well and involving nonlinearities with subcritical, critical and supercritical growth. Marco Souto, by using min-max techniques combined with an appropriate truncated argument and a priori estimate, establishes the existence of positive solutions for a class of stationary Schrödinger equations involving critical growth and potentials, which may decay to zero at infinity.

The work presented by João Henrique Andrade and João Marcos do Ó, focuses on qualitative properties for nonnegative solutions to elliptic systems driven by a Gross–Pitaevskii nonlinearity on a punctured domain. They aim to present some classification results and a description of the local behavior near an isolated (non-removable) singularity for second and fourth order systems of this class.

João Marcos do Ó, Olímpio H. Miyagaki and Cláudia Santana, by using

a variational approach, proved the existence of weak solutions of a class of systems of quasilinear Schrödinger equations.

Editorial Board

José V. Cardoso,

Patricio Cerda

Leonelo Iturriaga

João Marcos B. do Ó

Denilson Pereira