SPECIAL ISSUE

Title

Recent Advances in Optimization: Machine Learning, Fractional Calculus, and Applications

Editors

Prof. dr hab. **Ewa Bednarczuk**
Warsaw University of Technology
Systems Research Institute, Polish Academy of Sciences
email: ewa.bednarczuk@ibspan.waw.pl
profile: https://scholar.google.com/citations?user=XBp4K0cAAAAJ&hl=en

Prof. dr **Kai Diethelm**
ISR-Institute for Systems and Robotics
Technical University of Applied Sciences Würzburg-Schweinfurt
email: kai.diethelm@thws.de
profile: https://fang.thws.de/fakultaet/personen/professorinnen-professoren-und-lehrkraefte/person/prof-dr-kai-diethelm/

Prof. dr hab. **Agnieszka B. Malinowska**
Faculty of Computer Science
Bialystok University of Technology
email: a.malinowska@pb.edu.pl
profile: https://scholar.google.com/citations?user=nlo3ITIAAAAJ&hl=pl

About

Optimization has become one of the fundamental pillars of modern applied mathematics and computer science, driving advances in machine learning, artificial intelligence, engineering, and computational modeling. At the same time, fractional calculus has emerged as a powerful mathematical framework for describing complex dynamical systems with memory and nonlocal effects, enabling the development of new optimization methodologies beyond the capabilities of classical approaches.

This Special Issue aims to present recent theoretical, computational, and application-oriented advances at the intersection of these rapidly developing research areas. It will provide a forum for researchers working on optimization methods for machine learning, optimization techniques involving fractional-order models, and related mathematical and computational challenges. By bringing together contributions from these complementary fields, the Special Issue seeks to highlight recent developments that strengthen the connections between optimization theory, numerical analysis, and real-world applications.

The Special Issue welcomes original research papers presenting novel mathematical results, algorithmic developments, computational techniques, and interdisciplinary applications. It is intended for researchers in applied mathematics, computer science, engineering, and related disciplines who are interested in the development and application of advanced optimization methods.

Scope

Topics of interest include, but are not limited to: mathematical foundations of optimization; optimization algorithms for machine learning and artificial intelligence; convex, nonconvex, stochastic, and distributed optimization; deep learning optimization and large-scale optimization methods; numerical optimization and computational algorithms; fractional calculus and fractional differential equations; fractional variational calculus and optimal control; optimization of systems governed by fractional differential equations; numerical methods for fractional-order optimization problems; inverse problems and parameter estimation involving fractional models; optimization in robotics, autonomous systems, signal and image processing; applications of optimization in engineering, biology, medicine, economics, and finance; data-driven optimization and hybrid approaches combining machine learning with fractional modeling; emerging optimization techniques for complex and multidisciplinary systems.

Important dates

Submission deadline: **31 May 2027**
Notification of acceptance: **October 2027**
Possible publication: **Late 2027**

Information for authors

- The papers should meet high quality journal manuscript guidelines, in terms of research results, editorial quality, and language. Poorly written manuscripts will not be considered for review.
- The submission must be done online at www.amcs.uz.zgora.pl/?action=submission.
  Important! In your paper file, please put as the first keyword asterisked ***Optimization***.
- The papers should be prepared with the journal LaTeX template, following strictly the guide for authors available at www.amcs.uz.zgora.pl/?action=guide. The preferred length of papers - up to 10 pages.
- The submissions will undergo a review process, following the journal rules. The final decision will be made by the journal's Editor-in-Chief and Guest Editors.
- Please note that publication in *AMCS* is subject to page charges, invoiced upon paper acceptance. For details, please visit www.amcs.uz.zgora.pl/?action=guide.