Special Issue

Advanced Studies in Mathematical Optimization and Machine Learning

Message from the Guest Editor

This Special Issue explores the growing synergy between mathematical optimization and machine learning, aiming to highlight innovative research that addresses both theoretical and practical challenges. As machine learning models become more complex, there is a critical need for optimization techniques that are mathematically rigorous and computationally efficient. We invite high-quality submissions on topics such as convex and non-convex optimization, stochastic and adaptive methods (e.g., SGD, Adam), variational techniques in Bayesian learning, and bilevel or multi-objective optimization for meta-learning and neural architecture search. Contributions that integrate optimization with symbolic reasoning, graph-based learning, reinforcement learning, or control theory are also welcome. Emphasis is placed on works providing theoretical guarantees related to optimality, stability, and convergence. Applications in medical data analysis, generative AI, GAN-based models, signal processing, finance, and control systems are particularly encouraged. The goal is to foster cross-disciplinary innovation by bridging foundational optimization theory with real-world machine learning practice.

Guest Editor

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About the Journal

Message from the Editor-in-Chief

The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

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