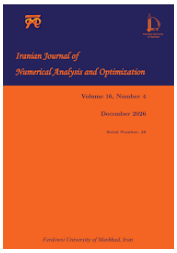
Special issue on:

Machine Learning in Numerical Analysis and Optimization: Theory and Computation

Iranian Journal of

Numerical Analysis and Optimization (IJNAO)



- **Scopus Indexed, Indexed in DOAJ and zbMATH Open**
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Guest Editors

Ali Emrouznejad, Milan Hladík, Reza Mokhtari, Majid Soleimani-damaneh, Max Winkler

Call for papers

The *Iranian Journal of Numerical Analysis and Optimization (IJNAO)* is pleased to announce a Special Issue entitled **"Machine Learning in Numerical Analysis and Optimization: Theory and Computation."**

The rapid development of machine learning and artificial intelligence is creating new opportunities for the design, analysis, and implementation of advanced numerical and optimization methods. At the same time, numerical analysis and mathematical optimization provide essential theoretical foundations for assessing the accuracy, stability, convergence, robustness, efficiency, and reliability of learning-based computational methods.

This Special Issue focuses on recent theoretical, methodological, and computational advances in machine learning for numerical analysis and optimization, with particular emphasis on mathematically grounded, reliable, and efficient approaches for scientific computing.

We welcome high-quality original research articles, methodological contributions, and comprehensive review papers presenting new theoretical results, numerical algorithms, computational frameworks, or applications. Contributions that combine machine-learning techniques with established numerical or optimization methods, as well as those providing mathematical analysis of learning-based computational approaches, are particularly encouraged.

Scope and Topics:

Topics of interest include, but are not limited to:

- Machine learning-assisted numerical methods
- Scientific Machine Learning (SciML)
- Neural networks for numerical computation and approximation
- Physics-informed neural networks (PINNs) and related methods
- Neural operators and operator-learning methods, including DeepONet-type approaches
- Data-driven numerical methods for differential and integral equations
- AI-accelerated methods for integer- and fractional-order ODEs, PDEs, and integral equations
- Mathematical analysis of learning-based numerical methods, including error analysis, stability, convergence, and robustness
- Numerical approximation and approximation theory for machine-learning models
- Adaptive, multiscale, and data-driven discretization methods
- Machine learning for mesh generation, refinement, and adaptive computation
- Numerical linear algebra combined with machine learning
- Iterative solvers, preconditioning, eigensolvers, and low-rank methods enhanced by learning
- Tensor methods and high-dimensional numerical computation
- Reduced-order models and surrogate modeling
- Inverse problems, parameter identification, and data assimilation
- Uncertainty quantification and Bayesian computational methods
- High-performance and parallel scientific computing enhanced by machine learning
- Learning-based optimization algorithms

- Machine learning for mathematical programming and numerical optimization
- Machine-learning-enhanced metaheuristic algorithms
- Deep learning and reinforcement learning for optimization and decision-making
- Automated algorithm selection and parameter or hyperparameter optimization
- Large-scale and high-dimensional optimization using machine learning
- Convex and nonconvex optimization with learning-based techniques
- Bayesian optimization and multi-fidelity optimization
- Optimization under uncertainty
- Large language models (LLMs) for numerical computation, mathematical reasoning, algorithm design, solver selection, and optimization

We also consider **novel applications** in computational physics, engineering, finance, healthcare, energy, climate modelling, logistics, and other scientific and technological fields. We particularly encourage studies supported by sound mathematical formulation, theoretical analysis, numerical validation, or demonstrable computational advantages, rather than purely empirical applications of standard machine-learning techniques.

Instructions for Authors:

Authors should submit a cover letter and manuscript via the journal's online submission site. Manuscripts submitted after the deadline may not be considered for the special issue and, if accepted, may be transferred to a regular issue.

Please see the Author instructions on the website. When submitting, please select the special issue's title "**SI: NAO-ML**" to ensure that it will be reviewed for this special issue (https://ijnao.um.ac.ir).

Submitted papers must be original and should not have been previously published or currently under consideration for publication elsewhere. All papers will undergo a rigorous peer review process managed by the Guest Editors. Accepted papers will be published online individually before the print publication.

Important Dates:

1 October 2026→	Submission open: Submit at: https://ijnao.um.ac.ir (**Early submission recommended; the referee process starts once the paper is received; accepted papers will be published individually online as they are accepted**)
31 May 2027 →	Submission close
31 July 2027 →	Notification of status and acceptance of paper
30 September 2027 →	Revised manuscripts
31 October 2027 →	Final version of paper

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