

Special Issue

Mathematical Foundations and Programming Languages: Advancing Machine Learning and Neural Networks

Message from the Guest Editor

This Special Issue explores the mathematical and programming foundations essential to the next generation of machine learning systems, including large language models, autonomous agents, and embodied intelligence. As these systems grow in complexity and real-world impact, there is a pressing need for theoretical rigor, interpretability, and efficiency.

We welcome contributions on optimization theory, non-convex approximation, probabilistic reasoning, and domain-specific programming languages that strengthen the expressiveness and reliability of modern ML. Topics include convergence analysis, geometric learning, DSLs for ML, formal verification, scalable optimization, symbolic-neural systems, agent cognition, and physics-informed models.

This Issue aims to bridge theory and application, highlighting innovations that ensure ML systems are robust, verifiable, and aligned with human-centered goals.

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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