Special Issue

Mathematical Foundations of Deep Neural Networks

Message from the Guest Editors

Deep learning is popular in various domains, e.g., computer vision, natural language processing, financing, medical applications, etc. Modern deep learning models include a huge number of parameters and demand a high computation power. One of the fundamental issues of machine learning models is their mathematical foundations, which provide insights into the model explanation, model design and network architecture search. In this Special Issue, topics related to the mathematical foundation of deep learning are welcomed, including but not limited to: geometric, topological, Bayesian, and game-theoretic formulations; analytical approaches to exploiting optimal transport theory, optimization theory, approximation theory, information theory, dynamical systems, partial differential equations, and mean field theory; exploring efficient training with small data sets, adversarial learning, reinforcement learning, and closing the decision-action loop; and foundational work on understanding success metrics, privacy safeguards, causal inference, algorithmic fairness, uncertainty quantification, interpretability, and reproducibility.

Guest Editors

Prof. Dr. Qingyao Wu

Prof. Dr. Xiaohang Wang

Prof. Dr. Xutao Li

Deadline for manuscript submissions

closed (31 May 2023)

MDPI

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.

Editor-in-Chief

Prof. Dr. Francisco Chiclana
School of Computer Science and Informatics, De Montfort University, The Gateway, Leicester LE1 9BH, UK

Author Benefits

High Visibility:
indexed within Scopus, SCIE (Web of Science), RePEc, and other databases.

Journal Rank:
JCR - Q1 (Mathematics) / CiteScore - Q1 (General Mathematics)

Rapid Publication:
manuscripts are peer-reviewed and a first decision is provided to authors approximately 18.4 days after submission; acceptance to publication is undertaken in 2.4 days (median values for papers published in this journal in the first half of 2025).