Special Issue

Advances in Finite Element Modeling and Mathematical Optimization for Engineering

Message from the Guest Editor

This Special Issue highlights recent advances in finite element modeling (FEM) and mathematical optimization, emphasizing their expanding role in computational mechanics and data-driven engineering. FEM now plays a central role in predicting complex physical behaviors, simulating failure mechanisms, and optimizing structural and material performance across engineering domains. We welcome original research, technical reviews, and case studies focusing on novel FEM formulations, multiphysics and multiscale modeling, topology and shape optimization, meshless methods, and machine learning-enhanced simulations. Contributions integrating FEM with experimental validation techniques such as DIC, CT, or NDE, or employing digital twin frameworks for real-time model updating, are particularly encouraged. Applications span structural, thermal, fluid, and biomedical systems, including nonlinear, time-dependent, or failure-driven problems. Topics also include surrogate modeling, uncertainty quantification, inverse methods, and FEM applied to advanced materials such as composites, superalloys, ceramics, and smart materials.

Guest Editor

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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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