Special Issue

Numerical Methods and Applications for Phase Field Models

Message from the Guest Editor

Our understanding of the universe varies with the scale at which we observe it; accordingly, different models are formulated to address phenomena at these various scales. A central idea in phase-field modeling is the introduction of one or more continuous order parameters that vary smoothly across interfaces. This framework has also been extended to the phase-field crystal method to study pattern formation and related phenomena. However, numerically solving phase-field equations remains challenging due to their strong nonlinearity, stiffness, higher-order nature, and coupling with other physical equations. Instead of pursuing analytical solutions, researchers commonly employ numerical schemes to solve these equations with sufficient efficiency and accuracy. This Special Issue (SI) aims to highlight significant recent developments in phase-field modeling and computational techniques. We are particularly interested in innovative numerical schemes based on artificial intelligence (AI) technologies, which hold great promise in enhancing the efficiency and scope of phase-field simulations, thereby advancing both scientific understanding and technological innovation.

Guest Editor

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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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