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Solutions of Integrable PDEs: Solving, Properties and Applications

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Message from the Guest Editors

Dear Colleagues,

Integrable PDEs (partial differential equations) are a special class of PDEs that can be solved exactly, meaning that an explicit expression for the solution can be obtained. This contrasts with non-integrable PDEs, where exact solutions are generally not possible, and numerical methods must be used.

Integrable PDEs have been studied extensively over the past several decades, and many powerful mathematical methods have been developed for their analysis. These methods include the inverse scattering transform, the inverse spectral method (including Riemann–Hilbert problems), the method of dressing transformations, the Painlevé test, and the Lax pair method.

Integrable PDEs have important applications in many areas of science and engineering, including fluid mechanics, quantum field theory, nonlinear optics, and soliton theory. Some examples of integrable PDEs include the Korteweg–de Vries equation, the nonlinear Schrödinger equation, and the sine-Gordon equation. The study of integrable PDEs has led to many important insights into the nature of nonlinear phenomena and has opened up new avenues for research in a wide range of fields.

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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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