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Asymptotic Methods in the Theory of Differential Equations and Mathematical Physics

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Message from the Guest Editors

Dear colleagues,

Asymptotic methods play an important role in modern theory of differential equations, mathematical physics, and their applications in continuum mechanics, quantum mechanics, etc. One main aim of asymptotic methods is to provide descriptions and formulas that are sufficiently close to the exact ones and at the same time are efficient, that is, easy to analyze, interpret, and visualize. With these systems, a combination of analytical and numerical approaches often works best, whereby, say, the numerical solution of ordinary differential equations of characteristics is used as an input for closed-form asymptotic expressions. This puts forward new challenges: new asymptotic formulas must be developed, and old ones must often be reworked with these computing systems in mind. The volume is intended to represent the state of the art in efficient asymptotics, mainly focusing on semiclassical (or geometric) asymptotics of rapidly varying solutions of wave and vortex type, boundary- and internal-layer asymptotics (including moving boundary layers), the adiabatic approximation, and asymptotics associated with homogenization (in spatial variables and in time).

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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