Special Issue

Advances in Mathematical Models and Partial Differential Equations: 2nd Edition

Message from the Guest Editors

In the study of partial differential equations (PDE), “blow-up” or “singularity” means the breakdown of a system within a finite time. The singularity formation in nonlinear physical systems has attracted the attention of many physics and mathematics researchers because of its physical significance and mathematical challenge. In this regard, a PDE system's lifespan is the maximum time before the solutions exist and are sufficiently smooth. In the study of PDE, symmetry assumptions or reductions are expected to facilitate the study of the lifespan of the nonlinear partial differential systems. In other words, symmetry is especially useful to analyze simpler cases of some complex systems. In this Special Issue, we expect that a theoretical or numerical study of the lifespan of nonlinear PDE, can be developed. To contribute to this Special Issue, we expect that the theoretical analysis can establish a sufficient condition on initial data that guarantees that the lifespan of the systems is finite. For the numerical study of the lifespan problem, the maximal existence time must be estimated with significant improvement.

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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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