Special Issue

Finite Elements and Symmetry

Message from the Guest Editor

As a numerical method for the approximate solution of partial differential equations, the finite element method has proven its efficiency, robustness and ability to handle most difficulties that arise in this area. The existence of an abundant literature, either theoretical or involving practical applications, shows the popularity of this method in numerical simulation. An aspect that has not been so widely considered in the literature is the handling of symmetries, in various aspects, in the problems to solve. Symmetry appears under various aspects, such as:

- Symmetries in domain geometry where this can be taken into account in order to simplify generation and adaptation of finite element meshes.
- Symmetry in boundary conditions that can contribute to simplify variational formulations.
- Symmetry in the model definition such as the use of symmetric tensors in continuum mechanics where this property can be sought in numerical simulation.
- Expected symmetry in solution and symmetry breaking in nonlinear bifurcation problems.

Guest Editor

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About the Journal

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.

Editor-in-Chief

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