Special Issue

Symmetry/Asymmetry in Numerical Analysis and Scientific Computing

Message from the Guest Editors

- This Special Issue of Symmetry examines the role of symmetry and asymmetry in numerical analysis and parallel computing algorithms, with a focus on their effects on performance optimization and computational efficiency.
- Symmetry is crucial for balancing loads in GPU and multi-GPU architectures, ensuring efficient resource utilization and minimizing bottlenecks in parallel processing. It also plays a vital role in optimizing performance in numerical analysis and parallel programming models like OpenMP, SYCL, OpenACC, and MPI, as well as their hybrid implementations. Effective load-balancing strategies guided by symmetry considerations help distribute workloads evenly across processing units, resulting in scalable and high-performance computing solutions.
- However, asymmetry is also significant, particularly in heterogeneous architectures where different computing resources such as CPUs, GPUs, and accelerators have varying performance characteristics. Addressing asymmetric workloads in numerical methods and parallel computing is an ongoing research challenge that requires adaptive scheduling and load-balancing techniques.

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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.

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