Special session
on

Numerical Methods for Scientific Computations and Advanced Applications

ABSTRACT

Scientific Computing became more and more important and universal approach for scientific studies in every branch of science, engineering, medicine, and even humanities.

The modern Scientific Computing is one of the most prominent examples of a truly interdisciplinary area. It is also the main instrument that allows us to utilize the huge computational resources of the contemporary and future high performance computer systems.

The tools of Scientific Computing are usually based on mathematical models and corresponding computer codes that are used to perform virtual experiments to obtain new data or to better understand existing experimental results. They are particularly important in situations when the cost of the experiments or their complexity is prohibitive.

Numerical Analysis is one of the crucial elements of Scientific Computing. It develops and analyzes numerical methods for discretization of continuous models and their subsequent solution, as well as for approximation of discrete data, such as: data interpolation and extrapolation, methods for solving linear and non-linear systems of algebraic equations, methods for solving systems of ordinary and partial differential equations, etc.

Another crucial element of Scientific Computing is the implementation of these numerical methods into computer codes and their customization for the numerous computing systems that are available nowadays. One very recent and important development in this direction is the implementation on various shared or distributed memory parallel computer systems and GPUs that allows for truly large-scale scientific computations.