

## **BOOK REVIEW**

### **Parallel Programming: Practical Aspects, Models and Current Limitations**

**Editor:** Mikhail S. Tarkov (Institute of Semiconductor Physics, Siberian Branch, Russian Academy of Sciences, Russia)

The book is a collection of articles describing the results of studying different problems related to parallel programming. The range of topics considered in ten chapters of the book shows how large is the domain of parallel programming applicability. Indeed, examples of the main directions of large scale computational methodology are presented: numerical modeling by partial differential equations, stochastic simulation using Monte Carlo methods, Lattice-Gas and asynchronous cellular automata, neural networks algorithms allocation onto multiprocessor architecture, as well as a meta-programming approach to parallelization and constructing robust interactions between concurrent processes.

All chapters present the results obtained by researchers working in the field of creating parallel programming technology for large scale problem implementation on supercomputers. In the first two chapters methods of mapping neural networks on distributed computer system with different architecture is shown and analyzed. The third and fourth chapters are devoted to numerical modeling of astrophysical phenomena on hybrid supercomputers, in them new approaches to combine fine grain and coarse grain parallelism are proposed and implemented. In fifth chapter some methods for achieving efficiency of parallel stochastic computations are proposed. Discrete hydrodynamics is represented by Lattice-Gas cellular automata approach in chapter 6, the results of parallel implementation on a supercomputer being given and analyzed. In Chapter 7 a comparative study of asynchronous cellular automata parallelization method for catalytic chemical processes simulation are given. The last three chapters have methodological character, rather than presenting original research results.

The book may be useful to students and researchers in the field of parallel computation.

Review provided by **Olga L. Bandman**, Chief Researcher, Professor, Institute of Computational Mathematics, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia