



Symposium on Asynchronous Methods in Scientific and Mathematical Computing

ASYM'07

Organized as part of IEEE/ACM/SCS **PADS'07** and ACM **FCRC'07**
 June 12-15, 2007, San Diego, California, USA

Overview

Of late, a variety of research efforts have been focusing on approaches that broadly fall under the classification of *asynchronous methods*. Asynchronous methods evolve the states of different parts of a system at largely independent, dynamically staggered time instants. Asynchrony of updates arises from various reasons, such as from the underlying multi-scale phenomena, or the choice of multi-scale models, or the dynamic nature of the system, or simply due to the use of relaxed update schemes.

Asynchronous methods are being motivated by reasons such as increasing the speed of sequential computation, for improving parallelism or decreasing the amount of computation and communication in a distributed computation setting, or for use as a more natural modeling paradigm. The applications of these methods span a wide range, such as molecular dynamics and plasma physics simulations, numerical integration schemes, and relaxation schemes for parallel execution.

This symposium is aimed at bringing the range of research in asynchronous methods together for cross-fertilization and facilitating the formulation of the underlying common theories and methods. It is also intended to bring together the diverse research community that is discovering this emergence of new asynchronous-time methods largely independently.

Scope

Of interest are approaches, methods, prototypes, experiences and viewpoints on the use of asynchronous-time (discrete event) approaches in scientific simulations and mathematical solvers. Papers are solicited that lend new light on underlying theory and implementation, or address issues such as accuracy, stability, speed of computation, flux conservation, parallel execution, speed vs. accuracy tradeoffs, fundamental limits of asynchronous evaluation, classification of asynchronously computable functions and so on. Example topics of interest are:

- Fundamental concepts of asynchronous updates to different parts of state
 - Physical system modeling with discrete event simulation (DES) approaches
 - Multi-scale system modeling and simulation with asynchronous methods
 - DES-based simulation of highly dynamic and/or heterogeneous systems.
- Algorithms, formal methods, analysis systems, frameworks, case studies, literature surveys, and performance analysis studies are all relevant to this symposium. Both sequential as well as parallel execution are within scope.

Example application domains

- Molecular dynamics
- Biological simulations
- Fluid dynamics
- Material simulations
- Plasma simulations
- Other physical system simulations.

Example mathematical computing topics

- Asynchronous integration methods
- DES-based ODE/PDE solution methods
- Asynchronous simulation of dynamical systems
- Continuous-discrete hybrid simulation.

Important Dates

Submission:	07 Mar 2007
Notification:	01 Apr 2007
Final Copy:	15 Apr 2007

Organizers

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Submissions

Manuscripts must be submitted electronically in PDF format via www.pads07.org/asym/conf.

All submissions will be reviewed using a double-blind review process, i.e., the identity of authors and referees will not be revealed to each other. See the symposium website for full details. Accepted papers will appear in the proceedings of the IEEE/ACM/SCS PADS 2007. Selected articles from PADS 2007 will be considered for extension and publication within a Special Issue of SCS **SIMULATION** journal.