Minisymposium Proposal IC/MP/015/E/802 : Verified Computations with Applications

Recently, the research in the field of verified numerical computations has made great progress. This minisymposium focuses on recent advances and gathers 8 papers from 5 countries, namely Japan, three countries in Europe and USA.

Starting from the presentation of recent results on highly accurate and fast summation algorithms, presentations for algorithms for numerical verification of geometric predicates and fast and accurate polynomial evaluation based on these summation algorithms will follow. Then, constraint global optimization with verification of the result will be discussed within a general framework of computer assisted proofs. As concrete examples of computer assisted proofs, scattering problems of sound and light, numerical existence and uniqueness theorems for PDEs and bifurcation problems will be treated. Finally, relations and applications to fuzzy logic will also be discussed.

This variety of talks will elucidate the state of arts of the rapidly developing research field on verified numerical computations.

A main focus of verified computations is to assist mathematical proofs by digital computers. As in old days a pocket calculator might have been used, todays digital computer's technology allow sophisticated support of mathematical proofs, for example by the verification of the assumptions of mathematical theorems. If this verification process is rigorous, the assertions are true.

Recently, there is much interest and progress in the field of verified numerical computations. This minisymposium focuses on recent advances and gathers 8 papers from 5 countries, namely Japan, three countries in Europe and USA.

Suggested speaker	Affiliation	Tentative topic
Vladik Kreinovich	Department of Computer Science	Intelligent control
	University of Texas at El Paso, USA	fuzzy logic
Philippe Langlois	Laboratoire LP2A	Accurate computations
	University of Perpignan, France	polynomial evaluations
Mitsuhiro T. Nakao	Faculty of Mathematics	Computer-assisted proofs
	Kyushu University, Japan	bifurcation problems
Arnold Neumaier	Faculty of Mathematics	Computer-assisted proofs
	University of Vienna, Austria	global optimization
Takeshi Ogita	CREST, Japan Science and	Accurate computations
	Technology Agency, Japan	geometrical predicates
Shin'ichi Oishi	Faculty of Science and Engineering	Scattering problems
	Waseda University, Japan	for sound and light
Michael Plum	Institute for Applied Mathematics I	Computer-assisted proofs
	University of Karlsruhe, Germany	partial differential equations
Siegfried M. Rump	Institute for Reliable Computing	Self-validating methods
	Hamburg University of Technology	extremely ill-cond. problems
	Germany	