
Infinite and Infinitesimal in Mathematics, Computing, and Natural Sciences

17-21 May 2010, Grand Hotel San Michele, Cetraro, Italy

<http://www.theinfinitycomputer.com/infinity2010>

THE FIRST CALL FOR PAPERS

The goal of the Workshop is to create a multidisciplinary round table for an open discussion on modelling nature by using traditional and emerging computational paradigms.

Mathematics and natural sciences offer discrete and continuous models to describe space, processes, and events occurring in nature. Very often both approaches use notions of infinite and infinitesimal in order to create coherent models. It is assumed that it is possible to work with infinitesimal quantities and/or to execute an infinite number of steps in algorithms. However, our abilities in computing are limited and only a finite number of computational steps can be executed by humans and machines.

The Workshop will discuss all aspects of the usage of infinity and infinitesimals in mathematics, computing, philosophy, and natural sciences. Fundamental ideas from theoretical computer science, logic, set theory, and philosophy will meet requirements and new fresh applications from physics, chemistry, biology, medicine, and economy. Researchers from both theoretical and applied sciences are very welcome to submit their papers and to use this excellent possibility to exchange ideas with leading scientists from different research fields. Papers discussing new computational paradigms and their impact on natural sciences are particularly solicited.

A special attention will be dedicated to the new methodology allowing one to execute numerical computations with finite, infinite, and infinitesimal numbers on a new type of a computational device - the Infinity Computer (EU patent 1728149). The new approach is based on the principle 'The part is less than the whole' introduced by Ancient Greeks that is applied to all numbers (finite, infinite, and infinitesimal) and to all sets and processes (finite and infinite). The new methodology evolves Cantor's ideas in a more applied way and introduces new infinite numbers that possess both cardinal and ordinal properties as usual finite numbers. It gives the possibility to execute numerical computations of a new type and simplifies fields of mathematics where the usage of the infinity and/or infinitesimals is necessary.

There will be tutorials, discussion sections, and regular presentations.

Topics of the workshop include the following research streams and their interrelations with infinite and infinitesimal quantities

- * Analytical computations
- * Astronomy and infinity
- * Complexity and computability
- * Divergent processes and fractals
- * Foundations of mathematics
- * Infinity in economy

- * Infinity in natural sciences
- * Language theory
- * Logic and infinity
- * Modelling: continuous vs. discrete
- * Numerical analysis
- * Philosophy of mathematics
- * Physics of particles and infinitesimals
- * Quantum computing

More information at:

<http://www.theinfinitycomputer.com/infinity2010>

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