

Machines, Computations and Universality

This special issue of *Fundamenta Informaticae* is the first one of the journal which is devoted to papers motivated by a meeting of **MCU** conferences. **MCU** conferences, on **Machines, Computations and Universality** were created by me in 1995. The first edition held in Paris (1995). It was then decided to hold the conference every third year. The next issue held in 1998 at Metz (France), the third one in 2001 at Chişinău (Moldova) and the fourth held in Saint-Petersburg (Russia). This issue contains papers which continue works presented at **MCU2004**.

The present volume contains papers on different aspects of today researches on the topics of **MCU**. There are this time two papers on super-Turing computations, which witnesses that this trends receives more and more the attention it deserves. We are probably at a turn in the modelling of computation. It seems that more and more people consider that now, infinite time computations are a more realistic frame for dealing with actual computations.

There are also several papers on combinatorics which is tightly connected with many aspects of computability. Three papers range in this area: on codes, on polyominoes and on *araucarias*, a very interesting new concept.

More traditional topics in **MCU** conferences as membrane computing or nature inspired computations are also present here with three papers: on P systems with energy, on P systems simulating Fredkin gates and on the connection of observation with computation. Cellular automata are also a familiar topic of **MCU** conferences. Each meeting had at least two papers on this topic and special issues had also at least one. This issue follows the rule. There is a paper on new aspects of the synchronisation problem for cellular automata. There is also a paper on the decidability and undecidability of dynamical systems which is closely connected to cellular automata.

Two papers deal with complexity and universality from new points of view. One in the field of programming languages where the number of registers to perform universal computations is investigated. The other paper deals with language equations and show the power of this type of characterization of languages. In particular, it is proved that one variable is enough to obtain recursively enumerable languages when Boolean operations and concatenation are available.

This is the point to especially thank Andrzej Skowron, editor-in-chief of *Fundamenta Informaticae*, for giving me the occasion to witness the vitality of **MCU** topics. I am very thankful to the referees for

their important and careful work. By their remarks and suggestions they greatly contributed to improve the quality of the papers and the whole issue. Finally, I am sincerely greatly grateful to the authors for their interesting and valuable contributions.

I do hope that the reader will be pleased by this special issue.

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