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EDITORIAL

Theory and practice of natural computing: tenth edition

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This special issue of the journal *Neural Computing and Applications* contains an extended version of one of the best papers presented at the Tenth International Conference on the Theory and Practice of Natural Computing, TPNC 2020 & 2021, held virtually due to the COVID-19 pandemic on December 7–10, 2021. The conference was co-organized by University of Tsukuba and the Institute for Research Development, Training and Advice, Brussels/London.

TPNC 2020 & 2021 was the tenth event in a series dedicated to presenting and promoting research on the wide spectrum of computational principles, models, and techniques inspired by information processing in nature. We intended to attract both theoretical and applied contributions to nature-inspired models of computation, synthesizing nature by means of computation, nature-inspired materials, and information processing in nature.

Out of 39 submissions to the conference, 21 papers were accepted (which represents an acceptance rate of 54%). Among them, the authors of two papers were invited to submit to this special issue. Each submission was reviewed by three independent experts and, based on their comments, the guest editors decided to accept one paper (which represents an acceptance rate of about 3% out of the submissions to the conference).

Next, we briefly present the paper included in this special issue.

In the paper *Quantitative Extensions of Reaction Systems Based on SOS Semantics*, Linda Brodo, Roberto Bruni, Moreno Falaschi, Roberta Gori, Francesca Levi, and Paolo Milazzo deal with reaction systems (RSs) as a natural computing framework inspired by chemical reaction networks. Two quantitative variants of RSs are defined: the first one extends reactions with delays and duration, and the second one with the possibility of expressing concentration levels. Both extensions are obtained by modifying in a modular way a structural operational semantics (SOS) for RSs that the authors had proposed previously. This enables the reuse of many formal analysis techniques, favors the implementation of tools, and promotes further extensions that can be defined in a compositional way. The paper also provides a prototype logic programming implementation and applies the tool to various case studies: tumor growth, Th-cells differentiation, and neural communication.

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