Selected papers of the tenth international workshop on expressiveness in concurrency (EXPRESS 2003)

In the area of formal methods for system design, particularly in concurrency, the term expressiveness can be understood either as the ability of a specific notation, language or model to formally describe particular computational aspects or as the relationships between their relative expressive power.

The EXPRESS Workshops aim to bring together researchers interested in the expressiveness of various formal systems with a specific focus on the comparison between programming paradigms (such as concurrent, functional, imperative, logic and object-oriented programming) and between mathematical models of computation (such as process algebras, Petri nets, event structures, modal logics, rewrite systems, etc.).

This special issue of Theoretical Computer Science collects the full versions of seven selected papers from EXPRESS 2003, the 10th International Workshop on Expressiveness in Concurrency, which took place on September 2, 2003. For the workshop event, 9 out of 29 submissions were accepted for presentation, 2 more presentations were given by invited speakers.

After the workshop, 9 out of the 11 presentations led to the submission of full versions to the current special issue. These papers went through another rigorous reviewing procedure matching the standards of the journal; in the end, only the 7 papers in this issue were accepted.

The accepted papers investigate the expressiveness of computational systems from rather different perspectives.

The opening paper by Luca Aceto, Wan Fokkink, Anna Ingólfsdóttir and Bas Luttik confirms a conjecture of Bergstra and Klop (dating back to 1984) stating that the process algebra obtained by adding the auxiliary merge operator of Hennessy to the recursion free fragment of Milner’s Calculus of Communicating Systems is not finitely based modulo bisimulation equivalence.

Christie Bolton and Gavin Lowe introduce the failures class, a class of semantic models for describing concurrent systems in which each model is associated with a predicate that determines how much availability information is recorded. They show how refinement within members of this class corresponds to confirmation of non-standard measures of consistency, identify application areas for these measures of consistency and show how refinement in each model can be automatically tested.
Étienne Lozes studies the expressiveness of static connectives and their adjoint constructs for analyzing the spatial structure of objects in spatial logics. These connectives introduce a lot of complication from the model-checking point of view. It is shown that such adjoints, which in some cases make model-checking undecidable, do not add expressivity and are thus eliminable. Minimality results for fragments of the static ambient logic are also presented.

Sergio Maffeis and Iain Phillips concentrate on Cardelli and Gordon’s calculus of Mobile Ambients as a model of mobile computation and show that Turing completeness can be achieved merely using movement capabilities (and not dissolution). They also show that certain smaller sets of constructs of the calculus are either terminating or have decidable termination.

Richard Mayr shows that checking weak bisimulation equivalence of two context free processes (often called BPA processes) or checking weak regularity (finiteness up to weak bisimulation equivalence) is EXPTIME-hard. Moreover, adding a finite control of the minimal non-trivial size of 2 to the BPA process already makes weak bisimilarity undecidable.

Arnaud Carayol, Daniel Hirschkoff and Davide Sangiorgi consider the lambda calculus enriched with McCarthy’s amb operator, study an alternative semantics that ignores weak divergences (infinite computations along which convergence is always possible), and investigate the possibility of encoding (and the applicability of the resulting mapping, when possible) this enriched language into the asynchronous \( \pi \)-calculus.

Frank D. Valencia presents new positive decidability results for a timed concurrent constraint programming (ccp) model, called ntcc, equipped with a first-order linear-temporal logic (LTL) for expressing process specifications. The decidability results involve both the process equivalence defined on top of the calculus and the logic itself with applications of ccp to well-established formalisms for concurrency.

We wish to thank the authors of all papers as well as the referees for their careful and professional work. We also wish to thank Don Sannella for having accepted our proposal to edit this special issue of Theoretical Computer Science. Last but not least, we wish to thank EPFL (CH) and the University of l’Aquila (IT) for their support.

Flavio Corradini\textsuperscript{a}

Uwe Nestmann\textsuperscript{b}

\textsuperscript{a}Università di Camerino, via del Bastione 3
62032 Camerino, Italy
flavio.corradini@unicam.it

\textsuperscript{b}Faculté I&C, EPFL, 1015 Lausanne
Switzerland
uwe.nestmann@epfl.ch