

Introduction

This special issue of *Mathematical Structures in Computer Science* is devoted to the theory and applications of graph transformations. This research area dates back to the early seventies and is based on mathematical techniques from graph theory, algebra, logic and category theory. The theory of graph transformations has become attractive as a modelling and programming paradigm for complex graphical structures in a large variety of areas in computer science and for applications to other fields. During the Joint APPLIGRAPH/GETGRATS Workshop on Graph Transformation Systems (GRATRA 2000) – a satellite of ETAPS 2000 in Berlin – 35 lectures were presented by participants from all over the world. The authors of presentations that stressed the theoretical point of view were invited to submit a full version of their presentation to *Mathematical Structures in Computer Science*. After a careful refereeing process nine papers have been accepted, seven of which are included in this special issue.

The paper by Ehrenfeucht, Petre, Prescott and Rozenberg connects the important new area of DNA computing *in vivo* to our area of graph transformation. An application of hypergraph constructions to the static analysis of concurrent systems is presented by König, and normal forms for context-free node rewriting hypergraph grammars by Klempien-Hinrichs. The construction of pushout complements for ‘partly total algebras’ generalising attributed graphs is presented by Burmeister, Llabrés and Roselló. Finally, Courcelle and Makowsky present operations on relational structures (generalising different kinds of graphs and hypergraphs) that are compatible with monadic second order logic. Four other accepted papers could not be included in this special issue because of space limitations.

They will appear in regular issues of MSCS:

— R. Heckel, M. Llabrés, H. Ehrig and F. Orejas: *Concurrency and loose semantics of open graph transformation systems*.

— L. Helouet, C. Jard and B. Caillaud: *An event structure based semantics for high-level message sequence charts*.

— J. Larossa and G. Valiente: *Constraint satisfaction algorithms for graph pattern matching*.

— N. Verlinden and D. Janssens: *Algebraic properties for Local Action Systems*.

We are most grateful to all the referees of these papers, to Olga Runge and Claudia Ernel for technical support, and to Giuseppe Longo and Cambridge University Press for fruitful cooperation in editing this special issue.

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