

Algebra for Automata: Introduction

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(Joint work with RFC Walters)

I explained my personal motivation stemming from early work on automata and trace languages in the 80's for seeking an algebra of automata with interfaces and conditions to model compositional, concurrent, mobile and hierarchical systems. My work since the 80's involved such non-compositional models as Petri nets, Asynchronous automata, and Arnold-Nivat automata. In the early days in order to have a real system on which to base my research I studied the biological system of neurones of the arm which exhibits the such features as asynchrony, hierarchy, compositionality.

In the lecture I introduced our current model in which systems are represented as cospans and spans of graphs, or alternatively automata with conditions (on which sequential composition and feedback may take place) and interfaces (on which parallel composition and feedback may take place).

I explained by an example of a distributed sort how the sequential composition allows also the expression of change of geometry and mobility.

In brief, an expression in the algebra of spans and cospans of graphs may be thought of as a dynamic net of automata.

References:

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