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AN ESSAY ON GENERAL GRAMMARS

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ABSTRACT

Freund *et al.* introduced a framework of general sequential grammars. We study several aspects of this framework: (1) How to discuss accepting versus generating grammars in a general fashion. (2) How to integrate graph control within this framework. (3) We provide different multiset grammars as examples of this framework, leading us (for instance) to Petri nets and register machines. (4) We discuss insertion-deletion systems as yet another example, also combined with the other three already mentioned aspects.

Keywords: sequential grammars, graph control, accepting versus generating grammars, multiset grammars, insertion-deletion systems

1. Introduction

In [17], Freund, Kogler and Oswald introduced a rather general framework for regulated rewriting and exhibited several interesting features, relating them under rather weak assumptions. This work was based on a general model for sequential grammars. We are following up on this rather general framework by first showing that its set-up also incorporates in particular insertion-deletion systems and discuss graph-control in this context, as well as multiset rewriting. Also, we discuss issues about generation versus acceptance of languages in this setting.

This essay should be rather seen as a conceptual étude than a paper delivering deep technical results. However, we found the idea of combining several hitherto unrelated concepts as fruitful, hopefully inspiring future research.

2. A general model for grammars

We are first presenting the basic definition from [17]. This definition captures the idea of a grammar as a device that can generate, starting from few elementary objects, called axioms, other objects, using simple rules whose application is one of the characteristics of the concrete grammar type, and from these again more objects can be

Inspired by works by and discussions with Rudi F.