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SYMBOLIC MANIPULATION OF CODE PROPERTIES

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ABSTRACT

The FAdo system is a symbolic manipulator of formal languages objects, implemented in Python. In this work, we extend its capabilities by implementing methods to manipulate transducers and we go one level higher than existing formal language systems and implement methods to manipulate objects representing classes of independent languages (widely known as code properties). Our methods allow users to define their own code properties and combine them between themselves or with fixed properties such as prefix codes, suffix codes, error detecting codes, etc. The satisfaction and maximality decision questions are solvable for any of the definable properties. The new online system LaSer allows to query about code properties and obtain the answer in a batch mode. Our work is founded on independence theory as well as the theory of rational relations and transducers, and contributes with improved algorithms on these objects.

Keywords: algorithms, automata, codes, FAdo, implementation, independence, LaSer, maximal, regular languages, transducers, program generation

1. Introduction

Several programming platforms exist providing methods to transform and manipulate various formal language objects: Grail/Grail+ [29,36], Vaucanson [6,37], FAdo [2,10], OpenFST [21], JFLAP [14]. Some of these systems allow one to manipulate such objects within simple script environments. Grail for example, one of the oldest systems, provides a set of filters manipulating automata and regular expressions on a UNIX

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