Rewriting Techniques for Trees as Term and Code Generation
CODAS ANR Project Deliverable #3

Laure Gonnord, Thaïs Baudon, Carsten Fuhs

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1   Introduction

In the context of the CODAS's project, we studied rewriting transformations on trees (as terms), with the global objective of Task 3, which is the combination of rewriting techniques and classical scheduling techniques. This is still work in progress, however thanks to the M2 internship of Thaïs Baudon (Spring 2021), we are able to provide a first step as an internship report.

2   Contribution

In this report, we first show that although scheduling operations on efficient data structures apart from arrays should have a great impact on performance, there is nearly no work on this topic. However, some related work from the rewriting community gives us great insights about the link between termination and scheduling, that we propose to study further. Our contributions as a first step toward full efficient compilation of programs with inductive data structures are :

1. First algorithms for this parallel evaluation ;
2. A code generation algorithm to generate efficient parallel evaluators ;
3. A prototype implementation and first experimental results.

The internship report can be found at the following url :

http://laure.gonnord.org/pro/research/students/rapport_Baudon_M2SIF_2021.pdf

As one nice side-effect of this work, we were able to refine the notion of parallel rewriting complexity, which we published in the WST'21 workshop, and can be found at the following url :

https://hal.archives-ouvertes.fr/hal-03418400