Parallel Congruence Closure SAT solver

Enrico Martini, VR445204

***Abstract*—In this report is presented a parallel implementation of a satisfability solver for the congruence closure, able to solve a set of clauses in the quantifiers free fragment of first order logic, based on equality among variables, constants, function applications, recursive data structures with their elements and elements of arrays.**

I. Introduction

The first theory considered is the theory of equality with uninterpreted functions (EUF). It is the most important theory because its congruence closure algorithm is the core of the entire alghoritm.

II. Implementation

A. Algorithm

B. Parser

III. Validation

IV. Benchmarks

#Clause	Classic CC	4 threads	128 threads	1024 threads
128	0,03	0,0136	0,0004	0,0005
256	0,06	0,0309	0,0215	0,0006
512	0,127	0,1395	0,0943	0,0044
1024	0,309	0,2271	0,0789	0,0783
2048	0,592	0,2725	0,1600	0,1967
4096	1,179	0,8668	0,3725	0,3732
8192	2,712	2,4027	0,9725	0,9700
16384	6,507	6,5320	2,8630	2,7989
32768	21,929	19,8379	13,9582	13,7665

V. Performance Analysis

VI. Conclusion