Internship proposal
Design and implementation of the Parametrised Polyhedra Abstract Domain
Laure Gonnord, University of Lille

Context  This internship takes place in the EMERAUDE team of LIFL (Lille, France). The topics of this team include compilation for parallel platforms.

Internship Subject  Recently ([3]), we have combined methods and tools from automatic parallelisation domain and static analysis domain. We believe that this connection is worth to be studied.

This internship will investigate the use of parametrised polyhedra in static analysis. The classic Linear Relation analysis ([4, 5]), which is an abstract interpretation based on (rational) polyhedra, use parameters as if they were variables, which causes a strong loss of precision.

The candidate will design a new abstract domain, following the framework of [6], to deal with parametrised polyhedra ([1, 2]) instead of classical polyhedra. He will implement this abstract domain in the Aspic¹ Tool. He will apply his results on termination problems.

Desired knowledge / skills  Serious formal bases (in particular, automata and compilation) are required. The candidate will implement the abstract domain in his favorite programming language (preferably in OCaml or C++), and will use the piplib library²

Keywords  Static Analysis, Flowcharts Programs, Polyhedra, Linear Relation Analysis, Parameters.

Références


¹. http://laure.gonnord.org/pro/aspic/
². http://www.piplib.org/