Bachelor/Master/Diploma-Thesis
JLattice: Lattice reduction in JAVA

Current lattice basis reduction methods are implemented in C or C++. The most frequently used implementation is very difficult to maintain. The JLattice project aims at efficient and well-designed implementations of state-of-the-art lattice reduction algorithms.

Goals

The overall aim of the project is the implementation of lattice basis reduction algorithms in JAVA, using as few native libraries as possible. Since linear algebra plays a major role in lattice reduction, we will need a native library (running on MacOS, Win32, Win64, Linux32, Linux64) for efficient matrix manipulation and linear algebra operations. Most of the considered native libraries will be in C/C++. Some Fortran packages might be of interest as well.

The proposed bachelor thesis should assess the currently available alternatives and compare them in a reasonable benchmark. Furthermore, it should provide a JAVA interface for the "winning" native library.

In a master or diploma thesis, there will be further goals, which have to be discussed individually and depend on the results of the first assessment phase.

Required Skills

The required skills, in order of importance, are:

- Excellent skills in JAVA, including recent language features, knowledge of virtual machine parameters, garbage collection, JNI, profiling, etc;
- Good skills in C++, C, maybe even Fortran, on various platforms.

Knowledge of the english language goes without saying.

Contact

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