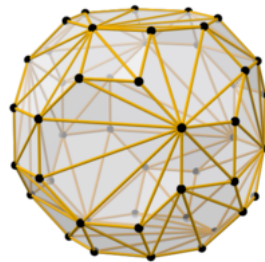


## Master's Thesis / Praxis der Forschung

# Formal verification of a vector library and a convex hull algorithm



**Context.** The use of floating point number is a common approximation of real numbers, proposing a compromise between range, accuracy and processing times.

**Problematic.** At the same time approximating real numbers by floating point numbers have consequences that are hard to predict.

**Potential.** Formal methods can help to detect automatically or manually errors in implementations.

**Objectif.** In collaboration with the IAM-CMS lab. of material science at KIT (<http://www.iam.kit.edu/cms/>), we want to show that a library for vectors and an algorithm computing the convex hull, both using floating points, has no runtime errors and is correct, i.e. input and/or result within a desired range.

**Your Task.** You can choose between abstract interpretation or verification condition generation using Frama-C (<https://frama-c.com>) to achieve one or more of the objectives. The proposed tool and methods are not mandatory.



Software Analyzers

**Your profile.** Ideally, you have a basic background in *formal systems* (e.g., from respective lectures of the KIT curricula). You are interested in applying existing Formal Methodes and have experience in C programming.

## Kontakt

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