

**BACHELOR PROJECT
CYLINDRICAL ALGEBRAIC DECOMPOSITION FOR
SEMIALGEBRAIC SETS**

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Sets in \mathbb{R}^n defined by polynomial inequalities are called semialgebraic. Given such a set, a *cylindrical algebraic decomposition* is a special decomposition into semialgebraic subsets, on which the defining polynomials have constant sign. Such decompositions can be obtained constructively, and they play an important role in computational real algebraic geometry. For example, they provide an effective version of Quantifier Elimination, one of the strongest abstract results in the area.

The goal of the project is to understand theory and applications of cylindrical algebraic decomposition, and to apply it to a special class of sets, so called *spectrahedra*.

REFERENCES

- [1] S. Basu, R. Pollack, M.-F. Roy: *Algorithms in real algebraic geometry*. Second edition. Algorithms and Computation in Mathematics, 10. Springer-Verlag, Berlin, 2006.