

EINLADUNG ZUM MATHEMATISCHEN KOLLOQUIUM

Es spricht

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zum Thema:

On convex polyhedron computations using floating point arithmetic

Abstract:

Convex polyhedra are not necessarily finite sets but they can be finitely represented. Thus they play an important role for various types of set computations, for instance in set optimization. Most of the computational techniques for polyhedra rely in some sense on vertex enumeration, which means to compute the vertices and extremal directions of a polyhedron which is given by (finitely many) linear inequalities. The inverse problem, which is equivalent by polarity, is called convex hull problem. In practice it is quite common to implement vertex enumeration and convex hull methods by using floating point arithmetic. However, in most situations there is no proof of correctness of the methods when inexact arithmetic is used. In particular, there is no correct practicable floating point algorithm known for polytopes of dimension larger than 3.

We demonstrate by examples that inexact computations can produce results which are far away from the correct ones. We present an approximate vertex enumeration method, which is shown to be correct for polytopes of dimension 2 and 3. We discuss why a generalization to any higher dimension is, if possible, not trivial.

**Mittwoch, 16.11.2022, 17:00 Uhr, Raum C 113 im Curiebau
(Kaffee 16:30 Uhr im Raum C 325)**

Alle Interessierten sind herzlich eingeladen.

Das Institut für Mathematik