OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

MAGDEBURG LECTURES ON OPTIMIZATION AND CONTROL

Friedrich Eisenbrand

Diameter of polyhedra: Abstractions, upper bounds and open problems

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Time & Place
The presentation on July 11, 2013 will be given in the Lukas Klause ›(Schleinufer 1, 39104 Magdeburg) (http://ifatwww.et.uni-magdeburg.de/syst/maloc/seminars/Standort%20Lukas%20Klause.pdf) and starts at 5.30 p.m.

Abstract
One of the most prominent mysteries in convex geometry is the question whether the diameter of a polyhedron is bounded by a polynomial in the number of facets. After Francisco Santos refuted the classical Hirsch conjecture in 2010, the polynomial Hirsch conjecture, stating that the answer to the question above is "Yes", has received considerable attention. The gap between the best known lower bound (linear) and the best known upper bound (n^{log d} by Kalai and Kleitman) is large.

In this talk I present the best known bounds mentioned above in a very simple abstract setting that does not involve any geometry. The polynomial Hirsch conjecture is also open in this abstract setting. I furthermore show polynomial upper bounds on the diameter of polyhedra that are defined by matrices with small sub-determinants and close with open problems.

Information about the Speaker
Friedrich Eisenbrand's main research interests lie in the field of discrete optimization, in particular in algorithms and complexity, integer programming, geometry of numbers, and applied optimization. He is best known for his work on efficient algorithms for integer programming in fixed dimension and the theory of cutting planes, which are an important tool to solve large scale industrial optimization problems.

Before joining EPFL in March 2008, Friedrich Eisenbrand was a full professor of mathematics at the University of Paderborn. Friedrich received the Heinz Maier-Leibnitz award of the German Research Foundation (DFG) in 2004 and the Otto Hahn medal of the Max Planck Society in 2001.