



Berlin
Mathematical
School

BMS Friday Colloquium

Friday 24 June 2011 at 14:15

Tea before the lecture begins at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin

Bernd Sturmfels

(UC Berkeley and MATHEON)

The Central Curve in Linear Programming

The central curve of a linear program is an algebraic curve specified by linear and quadratic constraints arising from complementary slackness. It is the union of the various central paths for minimizing or maximizing the cost function over any region in the associated hyperplane arrangement. We determine the degree, genus and defining ideal of the central curve, thereby answering a question of Bayer and Lagarias. These invariants, along with the degree of the Gauss image of the curve, are expressed in the language of matroid theory. This yields new bounds on the total curvature of the central path, a quantity relevant for interior point methods.

Based on joint work with Jesus De Loera and Cynthia Vinzant, this talk will feature many pictures illustrating the geometry of central curves.

Bernd Sturmfels received doctoral degrees in Mathematics in 1987 from the University of Washington in Seattle and TU Darmstadt. After two postdoctoral years in Minneapolis and Linz he taught at Cornell University before joining UC Berkeley in 1995, where he is Professor of Mathematics, Statistics and Computer Science. His honors include a National Young Investigator Fellowship, a Sloan Fellowship, a David and Lucile Packard Fellowship, a Clay Senior Scholarship, an Alexander von Humboldt Senior Research Prize, and the SIAM von Neumann Lectureship. Recently he served as Vice President of the American Mathematical Society. A leading experimentalist among mathematicians, Sturmfels has authored or edited 15 books and 190 research articles in the areas of combinatorics, algebraic geometry, polyhedral geometry, symbolic computation and their applications. His current research focuses on algebraic methods in optimization, statistics and computational biology.

This summer Bernd Sturmfels is MATHEON Guest Professor in Berlin.