



Kolloquium über Reine Mathematik

Einladung zu einem Vortrag

Dienstag, 30. Oktober 2018

17 Uhr s.t., Geom H4

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From algebraic curves to tropical curves to Lagrangian submanifolds

Abstract:

A quintic threefold is the hypersurface in complex projective 4-space cut out by a homogeneous polynomial equation of degree 5. It is the most famous Calabi-Yau manifold and the source of many interesting discoveries in pure mathematics and mathematical physics. A general quintic threefold contains 2875 straight lines. Katz studied where these lines move when one deforms the quintic into the union of the coordinate hyperplanes of projective 4-space. From here, for each line contained in a hyperplane, we may map it under the component-wise logarithm map $(\mathbb{C} \setminus \{0\})^3 \rightarrow \mathbb{R}^3$ and find that the spine of its image is what is called a tropical line, a piecewise linear graph.

Each of these tropical lines can in turn be used to construct a Waldhausen graph manifold fibering in 2-tori over the tropical curve. These graph manifolds embed as Lagrangian submanifolds in another Calabi-Yau manifold, the mirror dual of the quintic! They have many interesting properties. I will explain the motivation behind this journey from complex line to Lagrangian and what significance these have.

Vor dem Vortrag (ab 16.30 Uhr) stehen im Raum 327 Kaffee und Tee bereit.