



Berlin
Mathematical
School

BMS Friday Colloquium

Friday 21 April 2017 at 14:15

Tea & Cookies starting at 13:00

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

Michael Hutchings

(UC Berkeley)

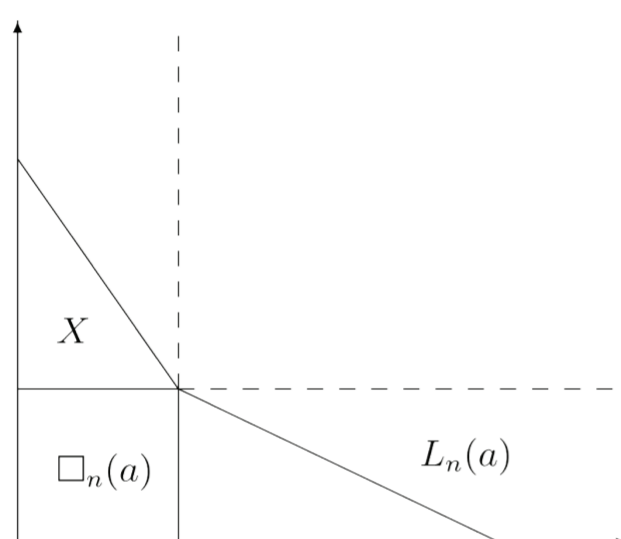
Symplectic embeddings of cubes

Symplectic geometry is the fundamental geometry underlying classical mechanics. Here a state of a physical system is encoded as a point in a $2n$ -dimensional symplectic manifold, the “phase space”, with n position coordinates and n momentum coordinates. The evolution of the system in time is described by a Hamiltonian vector field on the phase space.

A basic question in symplectic geometry is to determine when one symplectic manifold with boundary can be embedded, preserving the symplectic structure, into another. Even for simple examples such as ellipsoids and polydisks in \mathbf{R}^{2n} , this is a nontrivial problem, and the known answers often involve subtle combinatorics.

As Hutchings will explain in his talk, the existence of symplectic embeddings is closely related to the properties of the periodic orbits of Hamiltonian vector fields on the boundaries of the symplectic manifolds in question. In joint work with Jean Gutt, he uses this relation to obtain a combinatorial obstruction to symplectically embedding one convex toric domain in \mathbf{R}^{2n} into another. This obstruction is sharp when the domain is a cube.

Michael Hutchings is a professor of mathematics at UC Berkeley. He is known for his involvement in proving the double bubble conjecture on the shape of two-chambered soap bubbles, and for his work on circle-valued Morse theory and embedded contact homology. Hutchings got his PhD from Harvard in 1998 and won a Sloan Fellowship in 2003. He gave an invited talk at the ICM in 2010 and became a fellow of the AMS in 2012. Currently, Hutchings is on sabbatical at the HU Berlin.



resource: Kristie Sallee + Michael Hutchings