V5D3: Advanced topics in geometry

Steven Sivek

Wintersemester 2016/17
Di 8-10, 0.006; Do 8-10, 1.007

This course is an introduction to symplectic geometry. Symplectic geometry is the study of even-dimensional manifolds which are equipped with a closed, non-degenerate 2-form; the subject first arose naturally in Hamiltonian mechanics but is also closely related to many other fields including dynamical systems, complex geometry, and algebraic geometry.

We will begin by introducing basic properties and constructions of symplectic manifolds, and then in the second half of the course we will discuss modern techniques in the subject including Floer homology and holomorphic curves. Potential topics include Gromov's nonsqueezing theorem, Arnol'd's conjecture on periodic orbits of Hamiltonian vector fields, and applications to low-dimensional topology such as McDuff's "rational or ruled" theorem.

Suggested references include the following books:

- Ana Cannas da Silva, *Lectures on symplectic geometry*

- Dusa McDuff and Dietmar Salamon, *Introduction to symplectic topology*

- Dusa McDuff and Dietmar Salamon, *J-holomorphic curves and symplectic topology*

We will mostly use Cannas da Silva's book for the first part of the semester; it is freely available on her website or by clicking here.

More information about the course can be found at my website:

http://www.math.uni-bonn.de/people/sivek

The course page will be updated throughout the semester with additional references and descriptions of each lecture.

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