

COHOMOLOGICAL METHODS IN SYMPLECTIC AND POISSON GEOMETRY

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First Meeting: Room 27-H-46, February 19,
15:00-17:00

Tentative schedule:

Tuesdays, 15:00-17:00 (Room 27-H-46)
Wednesdays, 15:00-17:00 (Room 27-H-46)

A course for master and Ph. D. students

Hamilton's equations from classical mechanics may be defined on so-called Poisson manifolds, of which symplectic manifolds are a special case. Concrete examples of both symplectic and Poisson manifolds arise naturally in physical systems. In classical field theories the corresponding symplectic manifolds are infinite dimensional. In the presence of symmetries, one has to consider special submanifolds and the problem of their quantization arises. Ideas from cohomological algebra (especially resolutions and algebraic structures up to homotopy) turn out to be of fundamental importance.

List of topics

- (1) Recollections on symplectic and Poisson geometry, on symmetries and on quantization
- (2) Super vector spaces and supermanifolds
- (3) The BRS method (after Kostant and Sternberg)
- (4) The BFV method (after Stasheff)
- (5) Integration on supermanifolds
- (6) The BV method
- (7) Application to topological field theories and to deformation quantization

Prerequisites: Elements of differential geometry, algebraic topology, Lie theory.