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玉泉数学中心 203

February 25, 2012, Saturday, 13:30-16:30

**Title** Intersection theory in differential topology

**Abstract** In this talk I will establish the basics of intersection theory in differential topology. We aim to prove some classical theorems: Brouwer fixed-point theorem, Borsuk-Ulam theorem, Lefschetz fixed-point theorem, Poincar'e Hopf index theorem, and Hopf degree theorem (i.e. to compute  $\pi_n(S^n)$ ), which are now byproducts of the heavy machinery from algebraic topology. But we will treat it from a differentiable viewpoint instead of using homology. The most significant advantage of this approach lies in its visibility. The definitions, the theorems as well as their proofs are all very intuitive. During this expedition we will pick up lots of cheap tools which are very handy.

### References

- [1] John W. Milnor, *Topology form the Differentiable Viepoint*.
- [2] Victor Gullemin and Alan Pollack, *Differential Topolgy*.
- [3] Michael Spivak, *Calculus on Manifolds*.
- [4] John M. Lee, *Introduction to Smooth Manifolds*.