

Seminar on Floer homology, Part II

Winter term 2025/26

Prof. Bernd Ammann

Thursday, 14-16, M009

Number of sessions: **16**

Available Dates: 16.10. (SFB retreat in Windberg), 23.10., 30.10., 6.11., 13.11., 20.11., 27.11., 4.12. (Workshop: Surfaces on 4-manifolds), 11.12., 18.12., 8.1., 15.1. (Bernd absent), 22.1., 29.1., 5.2., 9.2.

Special obstruction:

- Oct 16, SFB retreat to Windberg
- Dec 4, Workshop on surface
- Jan 15, Bernd on confernece

Solution: all talks will last a bit longer than 90 minutes. Extra talk on Monday Feb 9th.

Organisational meeting: *23.10.*

Talk no. 1: Summary of where we are. *30.10. + 6.11.* STEFAN BASTL, RAPHAEL SCHMIDPETER, SAMUEL LOCKMAN.

Talk no. 2: More on J -holomorphic curves. *13.11. + 20.11.* STEFAN BASTL. Energy identity, unique continuation, critical points, somewhere injective curves, adjunction inequality [MS04, Sections 2.2 to 2.6] (Could be skipped)

Talk no. 3: Transversality and exponential convergence. *27.11. + 11.12.* ROMAN SCHIESSL. Discuss [Sal99, Sections 2.6 and 2.7]. Additional literature: [MS04, Chapter 3, in particular Section 3.2].

Talk no. 4: Definition of the Floer complex. *18.12. + 8.1.* RAPHAEL SCHMIDPETER.

Discuss compactness of the moduli space modulo bubbling. Then we have the necessary ingredients to define Floer homology. [Sal99, Sections 3.1 and 3.2]. Explain Floer's Theorems [Sal99, Theorems 3.5–3.7] without proofs.

Talk no. 5: Floer's gluing theorem. *22.1. + 29.1.* BERND AMMANN. Prove Floer's gluing theorem and use it to prove Theorem 3.5 [Sal99, Section 3.3].

Talk no. 6: Invariance of Floer homology. *5.2. + 9.2.* ZIANG LI. Present [Sal99, Sections 3.4 and 3.5]. These results provide proofs of Theorems 3.6 and 3.7 and finally the Arnold conjecture.

Seminar-Homepage:

<https://ammann.app.uni-regensburg.de/floer2/>

Literatur

- [MS04] Dusa McDuff and Dietmar Salamon. *J-holomorphic curves and symplectic topology*, volume 52 of *American Mathematical Society Colloquium Publications*. American Mathematical Society, Providence, RI, 2004.
- [Sal99] Dietmar Salamon. Lectures on Floer homology. In *Symplectic geometry and topology (Park City, UT, 1997)*, volume 7 of *IAS/Park City Math. Ser.*, pages 143–229. Amer. Math. Soc., Providence, RI, 1999. available [here](#).