

Lectures on symplectic 4-manifolds and Lefschetz pencils.

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General remarks: This is rather expository course. The main idea is to show WHAT can be proved, and not HOW the proofs work. So I will try avoid technical details, unless they are necessary to understand why some result/construction fails.

Syllabus of the course

Lecture 1+2. Symplectic topology and Darboux theorem. Symplectic topology in dimension 4.

Some constructions:

- Symplectic blow-up and contraction (=blow-down).
- Moser's theorem.
- Inflation.
- Symplectic connected sum.

Lecture 3. Almost complex structures and pseudoholomorphic curves. Symplectic vs complex geometry.

Applications:

- Uniqueness of symplectic blow-up.
- Inflation II.

Lecture 4. Lefschetz pencils on complex algebraic surfaces. Mapping class group and monodromy of Lefschetz pencils.

Lecture 5. Symplectic and topological Lefschetz pencils. Symplectization of topological Lefschetz pencils.