

Geometry and Integrability in Rigid Body Dynamics

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CONTENT OF THE COURSE

Rigid body systems occupy an important position in Analytical Mechanics and in the theory of integrable systems for a long time. Both classical and modern aspects of the theory will be presented. Relationship with Lie groups and algebras, Poisson geometry, algebraic curves and geometric control theory will be emphasized. Integration methods will be illustrated on the key examples.

PLAN OF THE COURSE

1. Basic notions and equations of motions in rigid body dynamics.
2. First integrals and the list of integrable cases.
3. Lie groups, symplectic structure and Hamiltonian systems on cotangent bundles.
4. Detailed analysis of the Euler and the Lagrange case. The Kowalevski case.
5. Natural generalizations and perspectives.

References

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