Fall 2016
MATH 80870
Michael Gekhtman

Topics in Mathematical Physics: Algebraic Methods in Theory of Integrable Systems

We will start by reviewing classical theory and examples of Liouville completely integrable systems of classical Hamiltonian mechanics. Then the modern theory of integrable models will be discussed including :

- Lax formalism for finite and infinite dimensional systems;

- integrable equations on Lie algebras and Poisson-Lie groups;

- integrable equations and nonlinear waves: Sato Grassmannian and KP hierarchy and its reductions;

- discrete integrable systems and connection with the theory of cluster algebras;

- (time permitting) quantum exactly solvable models.

All the background information will be provided.