ICTS Lecture Series

Title : Introduction to classical and quantum integrable systems

Speaker : Leon Takhtajan, Stony Brook University, New York

Date : 16, 17, 18 January 2017

Time : 11:00 - 12:30 PM

Venue : Madhava Lecture Hall, ICTS Campus, Bangalore

Abstract : Integrable (or exactly solvable) examples play a fundamental role in mathematics and theoretical physics. The notion of complete integrability in Hamiltonian mechanics goes back to classic work of Jacobi, Hamilton, Liouville and Poisson. For the famous problem of solving equations of motion of a spinning top - a rigid body with a fixed point in a constant gravitational field - the integrable cases were discovered by Euler, Lagrange and Sofia Kovalevskaya. The notion of integrability extends to the Hamiltonian systems with infinitely many degrees of freedom and to the quantum systems. In these lectures we review the classic examples and show, in case of the one-dimensional Heisenberg spin chain, how classical integrability bases on the r-matrix formalism naturally leads to the quantum Yang-Baxter equation and other ingredients of quantum integrability. We will also discuss some new development originated from physics.