

Quantum-classical duality between the Ruijsenaars-Schneider model and the quantum twisted spin chain: the trigonometric/anisotropic case and beyond

Maxim Beketov

MIPT, Skoltech
Institutskiy per.
Dolgoprudny, Moscow Region, Russia

Joint work with: A. Liashyk, A. Zabrodin, A. Zotov

The quantum-classical (QC) duality (correspondence) is an explicit relation between quantum and classical integrable systems of different types. This QC duality between the classical Ruijsenaars-Schneider (RS) model and the quantum twisted spin chain was proposed. Having demonstrated the duality for the rational case of RS and isotropic XX chain, we extend it to the trigonometric (hyperbolic) case from. The duality establishes an explicit relationship between the classical N-body trigonometric Ruijsenaars-Schneider model and the inhomogeneous twisted XXZ spin chain on N sites. Similarly to the rational version, the spin chain data fixes a certain Lagrangian submanifold in the phase space of the classical integrable system. The inhomogeneity parameters are equal to the coordinates of particles while the velocities of classical particles are proportional to the eigenvalues of the spin chain Hamiltonians (residues of the properly normalized transfer matrix). In the rational version of the duality, the action variables of the Ruijsenaars-Schneider model are equal to the twist parameters with some multiplicities defined by quantum (occupation) numbers. In contrast to the rational version, in the trigonometric case there is a splitting of the spectrum of action variables (eigenvalues of the classical Lax matrix).