Abstract

In 1967, Japanese physicist Morikazu Toda proposed an integrable lattice model to describe motions of a chain of particles with exponential interactions between nearest neighbors. Since then, Toda lattice and its generalizations have become the test models for various techniques and philosophies in integrable systems and wide connections are built with many other branches of mathematics. In this talk, I will characterize singular structure of solutions of the so-called full Kostant-Toda (f-KT) lattices defined on simple Lie algebras in two different ways: through the τ-functions and through the Kowalevski-Painlevé analysis. Fixing the spectral parameters which are invariant under the f-KT flows, we build a one to one correspondence between solutions of the f-KT lattices and points in the corresponding flag varieties. This talk is based on a recent preprint arXiv:2212.03679.