Integrable discretisations of the Euler top and the Zhukovski-Volterra gyrostat

Jaume Alonso

Technische Universität Berlin

When completely integrable Hamiltonian systems are discretised, the resulting discrete-time systems are often no longer integrable themselves. This is the so-called *problem of integrable discretisation*. Two known exceptions to this situation are the Kahan discretisations of the Euler top and of the Zhukovski-Volterra gyrostat with one non-zero linear parameter β. By looking at the geometry of the indeterminacy set of these maps and its relation to the dynamics of the systems, we develop a method to create new families of integrable discrete-time dynamical systems.