

SIDE 14.2



Contribution ID : 45

Integral preserving discretization of 2D Toda lattice

Wednesday 21 Jun 2023 at 09:45 (00h30')

Content :

2D-Toda lattices corresponding to the Cartan matrices of simple Lie algebras are known to be Darboux integrable, i.e. they admit complete families of essentially independent characteristic integrals. During the last three decades various discrete analogs of these systems were obtained. In 2011 Habibullin proposed a systematic way to discretize 2D-Toda lattices. His approach was based on the idea to look for semi-discrete systems such that they have the same characteristic integrals as their continuous analogs. Careful analysis of the systems corresponding to the Cartan matrices of the rank 2 allowed Habibullin and his collaborators to introduce semi-discrete and purely discrete analogs of 2D-Toda lattices and to conjecture that they are Darboux integrable for Cartan matrices of arbitrary rank. After that some partial results on Darboux integrability of these systems were obtained, but the general claim remained unproved.

We prove that if function I is a y -integral of 2D-Toda lattice corresponding to some Cartan matrix, then this function is an n -integral of its semi-discrete analog. This implies the existence of a complete family of n -integrals for each of these systems. We use the concept of characteristic algebra to prove that these systems admit complete families of characteristic x -integrals as well.

Primary authors : Dr. SMIRNOV, Sergey (Lomonosov Moscow State University)

Co-authors :

Presenter : Dr. SMIRNOV, Sergey (Lomonosov Moscow State University)

Session classification : Non-linear waves

Track classification : --not yet classified--

Type : --not specified--