

## A Difference Hamiltonian Operator and a Hierarchy of Generalized Toda Lattice Equations

XU Xi -Xi ang,<sup>1</sup> YANG Hong-Xi ang,<sup>2</sup> and DING Hai -Yong<sup>3</sup>

<sup>1</sup> College of Science, Shandong University of Science and Technology, Qingdao 266510, China

<sup>2</sup> Department of Computer Science and Technology, Taishan College, Tai'an 271021, China

<sup>3</sup> College of Information Science and Engineering, Shandong Agriculture University, Tai'an 271018, China

(Received: 2004-11-2; Revised: )

**Abstract:** A difference Hamiltonian operator with three arbitrary constants is presented. When the arbitrary constants in the Hamiltonian operator are suitably chosen, a pair of Hamiltonian operators are given. The resulting Hamiltonian pair yields a difference hereditary operator. Using Magri scheme of bi-Hamiltonian formulation, a hierarchy of the generalized Toda lattice equations is constructed. Finally, the discrete zero curvature representation is given for the resulting hierarchy.

PACS: 02.30.1k

**Key words:** Hamiltonian operator, bi-Hamiltonian formulation, hereditary operator, relativistic Toda lattice, modified Toda lattice, discrete zero curvature representation

[\[Full text: PDF\]](#)

Close