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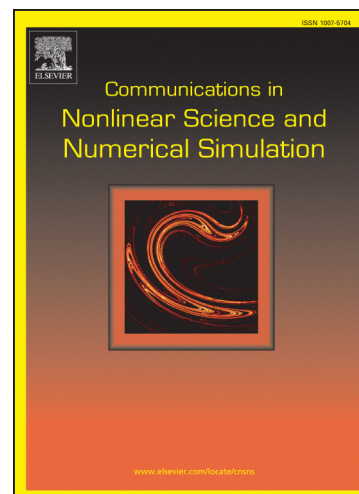
Bazar Babajanov, Michal Fečkan, Gayrat Urazboev

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# On the periodic Toda lattice with a self-consistent source

Bazar Babajanov<sup>a</sup>, Michal Fečkan<sup>b,c,\*</sup>, Gayrat Urazboev<sup>a</sup>

<sup>a</sup>*Department of Physics and Mathematics, Urgench State University, H. Alimdjan 14, 220100, Urgench, Uzbekistan*

<sup>b</sup>*Department of Mathematical Analysis and Numerical Mathematics, Comenius University, Mlynská dolina, 842 15 Bratislava, Slovakia*

<sup>c</sup>*Mathematical Institute, Slovak Academy of Sciences, Štefánikova 49, 814 73 Bratislava, Slovakia*

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## Abstract

This work is devoted to the application of inverse spectral problem for integration of the periodic Toda lattice with self-consistent source. The effective method of solution of the inverse spectral problem for the discrete Hill's equation is presented.

*Keywords:* Toda lattice, Hill's equation, self-consistent source, inverse spectral problem, trace formulas

*2000 MSC:* Primary 39A23, 35Q51, Secondary 34K13, 34K29

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## 1. Introduction

The Toda lattice [1] is a simple model for a nonlinear one-dimensional crystal that describes the motion of a chain of particles with exponential interactions of the nearest neighbors. The equation of motion for such a system is given by

$$\frac{d^2 u_n}{dt^2} = \exp(u_{n-1} - u_n) - \exp(u_n - u_{n+1}), \quad n \in \mathbb{Z}.$$

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\*Corresponding author.

*Email addresses:* a.murod@mail.ru (Bazar Babajanov),  
Michal.Feckan@fmph.uniba.sk (Michal Fečkan), gayrat71@mail.ru (Gayrat Urazboev)

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