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SOME ASPECTS OF THE SPECTRAL THEORY FOR $\mathfrak{sl}(3,\mathbb{C})$ SYSTEM WITH $\mathbb{Z}_2\times\mathbb{Z}_2\times\mathbb{Z}_2$ REDUCTION OF MIKHAILOV TYPE WITH GENERAL POSITION BOUNDARY CONDITIONS

ALEXANDAR YANOVSKI

Department of Mathematics & Applied Mathematics, University of Cape Town 7700 Cape Town, South Africa

Abstract. We consider some aspects of the spectral theory of a system that is a generalization to a pole gauge Zakharov-Shabat type system on the Lie algebra $\mathfrak{sl}(3,\mathbb{C})$ but involving rational dependence on the spectral parameter and subjected to $\mathbb{Z}_2\times\mathbb{Z}_2\times\mathbb{Z}_2$ reduction of Mikhailov type. The question of the existence of analytic fundamental solutions under some special type of boundary conditions has been considered, recently we consider boundary conditions in general position.

MSC:35Q51, 37K15, 34L10, 34L25
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1. Introduction

In this article we shall consider the linear problem $L_{S_{\pm 1}}\psi=0$ of the type

$$\mathrm{i}\partial_x\psi+\begin{pmatrix}0 & (\lambda-\lambda^{-1})u & (\lambda+\lambda^{-1})v\\ (\lambda-\lambda^{-1})u^* & 0 & 0\\ (\lambda+\lambda^{-1})v^* & 0 & 0\end{pmatrix}\psi=0 \tag{1}$$

with ‘boundary’ conditions

$$\lim_{x\to\pm\infty}u(x)=u_0,\qquad \lim_{x\to\pm\infty}v(x)=v_0.$$

In the above $u(x),v(x)$ (the potentials) are smooth complex valued functions on x where x belongs to the real line and by * is denoted the complex conjugation. In addition, the functions $u(x)$ and $v(x)$ satisfy the relation

$$|u(x)|^2+|v(x)|^2=1. \tag{2}$$