

RECURSION OPERATORS FOR RATIONAL BUNDLE ON $\mathfrak{sl}(3, \mathbb{C})$ WITH $\mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2$ REDUCTION OF MIKHAILOV TYPE

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Abstract. We consider the recursion operator related to a system introduced recently that could be considered as a generalization to a pole gauge generalized Zakharov-Shabat system on $\mathfrak{sl}(3, \mathbb{C})$ but involving rational dependence on the spectral parameter and subject to $\mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2$ reduction of Mikhailov type. We calculate the hierarchies of nonlinear evolution equations related to this system through the recursion operators we introduce.

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1. Introduction. Systems on $\mathfrak{sl}(3)$ and the GMV System

The generalized Zakharov-Shabat system (GZS) and Caudrey-Beals-Coifman system (CBC) in pole gauge on the algebra $\mathfrak{sl}(3)$ initially has been studied as an application of the general results about GZS and CBC system in pole gauge, see [1] and references in [2]. As a result, the generating operator has been calculated and some systems of Heisenberg Ferromagnet (HF) type with possible physical applications, [9]. The interest in the pole gauge systems was renewed after the system that we refer as GMV (Gerdjikov-Mikhailov-Valchev) has been introduced [3–5]. At the beginning the GMV system study started independently, spectral properties were studied and generating operators were calculated. Later it was pointed out that GMV could be treated as $\mathfrak{sl}(3)$ GZS system in pole gauge with additional reductions of Mikhailov type, so that the generating operators found for the GMV system could be obtained from the generating operator for the general $\mathfrak{sl}(3)$ system and geometric interpretation has been clarified [12]. Let us introduce the GMV