Hierarchies of Symplectic Structures for $\mathfrak{sl}(3,\mathbb{C})$ Zakharov-Shabat Systems in Canonical and Pole Gauge with $\mathbb{Z}_2 \times \mathbb{Z}_2$ Reduction of Mikhailov Type

Alexandar Ianovsky

Department of Mathematics & Applied Mathematics, University of Cape Town, South Africa
E-mail: Alexandar.Ianovsky@uct.ac.za

ABSTRACT

We consider the theory of the hierarchies of nonlinear evolution equations associated with two gauge-equivalent systems we denote by $L_\pm$ and $GMV_\pm$ (GMV-system). They are obtained from the Generalized Zakharov-Shabat system on $\mathfrak{sl}(3,\mathbb{C})$ in general position making a $\mathbb{Z}_2 \times \mathbb{Z}_2$ reductions of Mikhailov type in canonical and in pole gauge respectively. Using the Recursion Operators approach and expansions over the adjoint solutions we study the symplectic structures of the hierarchies of the nonlinear evolution equations associated with $L_\pm$ and $GMV_\pm$ and calculate the relation between them.