

Multi-component Levi Hierarchy and Its Multi-component Integrable Coupling System

XIA Tie-Cheng,¹ YOU Fu-Cai,¹ and ZHAO Wen-Ying²

¹ Department of Mathematics, Shanghai University, Shanghai 200444, China

² Department of Mathematics, Bohai University, Jinzhou 121000, China

(Received: 2005-1-24; Revised: 2005-4-8)

Abstract: A simple 3M-dimensional loop algebra \tilde{X} is produced, whose commutation operation defined by us is as simple and straightforward as that in the loop algebra \tilde{A}_1 . It follows that a general scheme for generating multi-component integrable hierarchy is proposed. By taking advantage of \tilde{X} , a new isospectral problem is established, and then by making use of the Tu scheme the well-known multi-component Levi hierarchy is obtained. Finally, an expanding loop algebra \tilde{F}_M of the loop algebra \tilde{X} is presented, based on the \tilde{F}_M , the multi-component integrable coupling system of the multi-component Levi hierarchy is worked out. The method in this paper can be applied to other nonlinear evolution equation hierarchies.

PACS: 02.30.Jr, 02.30.Ik

Key words: loop algebra, multi-component Levi hierarchy, multi-component integrable coupling system

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