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Abstract

Veronese webs are closely related to bi-Hamiltonian systems, as was shown by Gelfand and Zakharevich. Recently a correspondence between Veronese three-dimensional webs and three-dimensional Einstein–Weyl structures of hyper-CR type was established. The latter were parametrized by Dunajski and Krynski via the solutions of the dispersionless Hirota equation. In this paper we show relations of Veronese three-dimensional webs to several other integrable equations, deform these equations preserving integrability via a dispersionless Lax pair and compute the corresponding contact symmetries, Bäcklund transformations and Einstein–Weyl structures. Realization of Veronese webs through solutions of these deformed integrable PDE is based on a correspondence between partially integrable Nijenhuis operators to the operator fields with vanishing Nijenhuis tensor. This correspondence could be used to construct a link between bi-Hamiltonian finite-dimensional integrable systems and dispersionless integrable PDE related to the Veronese webs.

Keywords: Intergable system, Veronese web, nonlinear PDE, dispersionless Hirota equation, Nijenhuis tensor

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