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SOLUTIONS TO A VECTOR HEISENBERG FERROMAGNET EQUATION RELATED TO SYMMETRIC SPACES

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Abstract. In this report we consider a vector generalization of Heisenberg ferromagnet equation. That completely integrable system is related to a spectral problem in pole gauge for the Lie algebra $\mathfrak{sl}(n+1,\mathbb{C})$. We construct special solutions over constant background using dressing technique.

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1. Introduction

In [8], the authors of the current text introduced the following matrix system of completely integrable equations

$$\mathrm{i}\mathbf{u}_t + \Big[(\mathbf{u}Q_m\mathbf{u}^\dagger Q_n)_x\mathbf{u} - \mathbf{u}(Q_m\mathbf{u}^\dagger Q_n\mathbf{u})_x\Big]_x = 0 \qquad (1)$$

and the corresponding auxiliary spectral problem. Above, the subscripts mean partial differentiation, "†" denotes Hermitian conjugation and Q_m, Q_n are diagonal matrices of dimension m and n respectively having ± 1 on their principal diagonals. It is also assumed that the $n\times m$ matrix $\mathbf{u}(x,t)$ fulfill certain algebraic condition, see [8] for more details.

System (1) contains as particular cases the classical $1+1$ dimensional Heisenberg ferromagnet equation, known to be integrable through inverse spectral transform [2, 6] and some of its integrable generalizations recently studied [1, 9, 10]. Its Lax