Soliton solutions of the Hirota equation

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Abstract: It is well known that nonlinear integrable systems have attracted a lot of attention among researchers. This fascinating subject of nonlinear science has branched out in almost all areas of technology and science. In nonlinear science soliton solutions play an important role. There are many ways to obtain soliton solutions of the nonlinear evolution equations, such as the Painleve analysis [1], the Hirota's bilinear method [2], Darboux transformation (DT) [3] and so on. Among the various methods, the DT has been proved very successful in driving different kinds of solutions for many of the integrable equations from a trivial seed. In this work, we focus on the construction soliton solutions for the 2+1-dimensional Hirota equation [4], which is modified nonlinear Schrodinger equation. One-soliton solutions are obtained by means of the one-fold Darboux transformation for the 2+1-dimensional Hirota equation.

Keywords: Hirota equation, Darboux transformation, soliton solution

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References

[1] Bindu S.G. , Mahalingam A. and Porsezian K. "Dark soliton solutions of the coupled Hirota eqaution in nonlinear fiber", *Physics Letters A*, Vol.286, pp.321-331, 2001.

[2] Gui M., Zhenyun Q. "Construction of Nth-order rogue wave solutions for Hirota equation by means of bilinear method", *www.arxiv.org*, 2014.

[3] Yesmakanova K.R., Shaikhova G.N., Bekova G.T. and Myrzakulova Zh.R. "Determinant Reprentation of Dardoux Transformation for the (2+1)-Dimensional Schrdinger-Maxwell-Bloch Equation", *Advances in Intelligent Systems and Computing*, Vol. 441, pp.183-198, 2016.

[4] Myrzakulov R., Mamyrbekova G. K., Nugmanova G.N and Lakshmanan M. "Integrable (2+ 1)-dimensional spin models with self-consistent potentials", *Symmetry*, Vol. 7(3), pp.1352-1375, 2015.