

Variable Separation Approach for a Differential-difference Asymmetric Nizhnik-Novikov-Veselov Equation

Xian-min Qian^{a,b,d}, Sen-yue Lou^{a,c}, and Xing-biao Hu^d

^a Physics Department of Shanghai Jiao Tong University, Shanghai, 200030, China

^b Physics Department of Shaoxing college of arts and sciences, Shaoxing, 312000, China

^c Physics Department of Ningbo University, Ningbo, 315211, China

^d State Key Laboratory of Scientific and Engineering Computing, Institute of Computational Mathematics and Scientific Engineering Computing, Academy of Mathematics and Systems Sciences, Academia Sinica, PO Box 2719, Beijing 100080, China

Reprint requests to Prof. S.-y. L.; e-mail: sylou@sjtu.edu.cn

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The multi-linear variable separation approach is applied to a differential-difference asymmetric Nizhnik-Novikov-Veselov equation. It is found that the solution formula ANNV equation is rightly the semi-discrete form of the continuous one which describes some types of special solutions for many (2+1)-dimensional continuous systems. Moreover, it is different but similar to that of a special differential-difference Toda system. Thus abundant semi-discrete localized coherent structures of the ANNV equation are easily constructed by appropriately selecting the arbitrary functions appearing in the final solution formula. A concrete method to construct multiple localized discrete excitations with and without completely elastic interaction properties are discussed. It is found that for some types of bounded solitoff modes, they can exchange solitoffs, move in new different directions, extend the lengths of solitoffs, etc. after finishing their interactions. – PACS numbers: 0230, 0220, 0540

Key words: Multi-linear Variable Separation Approach; Differential-difference ANNV Equation; Semi-discrete Localized Coherent Structures.