Zhou, Xuejun; Ilhan, Onur Alp; Manafian, Jalil; Singh, Gurpreet; Salikhovich Tuguz, Nalbiy

N-lump and interaction solutions of localized waves to the (2+1)-dimensional generalized KDKK equation. (English) [Zbl 1479.35732]

Summary: Under investigation in this paper is the generalized (2+1)-dimensional Konopelchenko-Dubrovsky-Kaup-Kupershmidt equation. Based on the bilinear Hirota method, the $M$-lump solution and $N$-soliton solution are constructed by giving some special activation functions in the considered model. By means of symbolic computation, these analytical solutions and corresponding rogue waves are obtained with the aid of Maple software. Then, by employing the long wave limit method to the $N$-soliton solutions, $M$-lump solutions including 1-lump, 2-lump and 3-lump and the hybrid solutions between lump and solitons and between $M$-lump and soliton were obtained. Finally, via symbolic computation, their dynamic structures and physical properties were vividly shown by plotting different three-dimensional designs, two-dimensional designs, density designs. These solutions have greatly enriched the exact solutions of (2+1)-dimensional generalized (2+1)-dimensional Konopelchenko-Dubrovsky-Kaup-Kupershmidt equation on the existing literature.

MSC:
35Q51 Soliton equations
35Q53 KdV equations (Korteweg-de Vries equations)
35C08 Soliton solutions
68W30 Symbolic computation and algebraic computation

Keywords:
$M$-lump solution; $N$-soliton solution; Hirota bilinear operator method; Konopelchenko-Dubrovsky-Kaup-Kupershmidt equation

Software:
Maple

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References:


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