

Bilinear identity for an extended KP hierarchy

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Abstract:

In this talk, we construct the bilinear equations for an extended Kadomtsev-Petviashvili (KP) hierarchy (introduced by the authors [1]). By introducing an auxiliary parameter, whose flow corresponds to the so-called squared eigenfunction symmetry of KP hierarchy, we find the tau-function for this extended KP hierarchy. It is shown that the bilinear equations generate all the Hirota's bilinear equations for the zero-curvature forms of the extended KP hierarchy, which includes two types of KP equation with self-consistent sources (KPSCS) [2]. It seems that the Hirota's bilinear equations obtained in this paper for KPSCS are in a simpler form by comparing with the existing results. (This is a joint work with Xiaojun Liu and Yunbo Zeng [3].)

References:

1. X.J. Liu, Y.B. Zeng, R.L. Lin, A new extended KP hierarchy, *Phys. Lett. A* **372** (2008), 3819–3823.
2. V.K. Mel'nikov, Interaction of solitary waves in the system described by the Kadomtsev-Petviashvili equation with a self-consistent source. *Commun. Math. Phys.* **126** (1989), 201–215.
3. R.L. Lin, X.J. Liu, Y.B. Zeng, Bilinear identities and Hirota's bilinear forms for an extended Kadomtsev-Petviashvili hierarchy, arXiv:1302.5477.