Explicit Flow Equations and Recursion Operator of the ncKP hierarchy

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Abstract:

In this talk, the noncommutative Kadomtsev-Petviashvili (ncKP) hierarchy will be discussed. The explicit expression of flow equations of the ncKP hierarchy is derived. By comparing with the flow equations of the KP hierarchy, this result shows that the additional terms in flow equations of the ncKP hierarchy indeed consist commutators of dynamical coordinates \( \{u_i\} \). The recursion operator for the flow equations under the \( n \)-reduction is presented. As an example we calculate the recursion operator of the noncommutative Korteweg-de Vries (ncKdV) hierarchy, which generates a hierarchy of local, higher order flows. Thus we solve the open problem suggested by P.J. Olver and V.V. Sokolov (Commun. Math. Phys. 193 (1998), 245-268).

References: