

Noncommutative Inverse Scattering Method for the Kontsevich system

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In my talk I will formulate an analog of Inverse Scattering Method for integrable systems on noncommutative associative algebras. In particular I will define Hamilton flows, Casimir elements and noncommutative analog of the Lax matrix. The noncommutative Lax element generates infinite family of commuting Hamilton flows on an associative algebra. The proposed approach to integrable systems on associative algebras satisfy certain universal property, in particular it incorporates both classical and quantum integrable systems as well as provides a basis for further generalization. The motivation for definition will be given by explicit construction of noncommutative analog of Lax matrix for a system of differential equations on associative algebra recently proposed by Kontsevich. First these equations will be presented in the Hamilton form by defining a bracket of Loday type on the group algebra of the free group with two generators. To make the definition more constructive I will utilize (with certain generalizations) the Van den Bergh approach to Loday brackets via double Poisson brackets. Finally, it will be shown that there exists an infinite family of commuting flows generated by the noncommutative Lax element.