LAX REPRESENTATIONS FOR ODES AND PDES.

VLADIMIR SOKOLOV (LANDAU INSTITUTE FOR THEORETICAL PHYSICS)
VSOKOLOV@LANDAU.AC.RU

Tipo de Atividade: palestra

Carga horária: 1 hora.

Público-alvo: Alunos de graduação em Matemática, alunos de pós-graduação em Matemática.

Resumo: The modern theory of integrable systems was inspired by the discovery of the inverse scattering method. The main ingredient of this method is a Lax representation for the differential equation under investigation.

A Lax representation for a given differential equation is a relation of the form

$$(1) \qquad L_t = [A, \, L],$$

where L and A are some linear operators, which is equivalent to the differential equation. To apply the technique of the inverse scattering method the operators L and A should depend on an additional (complex) parameter λ.

For the simplest models the λ-dependence is polynomial or rational. The first lecture is devoted to such systems. A number of carefully selected examples are presented. The main questions are: 1. Given a Lax representation, how one can it; 2. How to construct wide classes of Lax representations related to simple Lie algebras and to Kac-Moody algebras. Some related algebraic constructions are discussed.

Referências

[1] Gel'fand I. M. and Dikii L. A. **Fractional powers of operator and Hamiltonian systems**. Funct. Anal. Appl., 1976, **10**(4), 259–273.

[2] Zakharov V.E. and Shabat A. B. **Integration of nonlinear equations of mathematical physics by the method of inverse scattering. II,**. Funct. Anal. Appl., 1979, **13**(3),

VLADIMIR SOKOLOV (LANDAU INSTITUTE FOR THEORETICAL PHYSICS) VSOKOLOV@LANDAU.AC.RU

166–174.

[3] Drinfeld, V.G. and Sokolov, V.V., **Lie algebras and equations of Korteweg de Vries type**. Jour. Sov. Math., 1985, **30**, 1975-2036.