Jornada de Álgebra no Amazonas - terceira edição
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DECOMPOSITION OF LOOP ALGEBRAS.

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Tipo de Atividade: Palestra

Carga horária: 1 horas.

Público-alvo: alunos de graduaço em Matemática, ou alunos de p'os-graduação em Matemática.

Resumo: In the first lecture we considered Lax pairs with polynomial and rational dependence on the spectral parameter λ. However, there exist important examples, where λ is a parameter on algebraic curves.

If we don't want to fix *a priori* the λ-dependence in Lax operator L, we may assume that L is a Laurent series in λ with coefficients being elements of a finite-dimensional Lie algebra $\mathcal{G}$.

If we assume that L and A in the Lax equation are elements of $\mathcal{G}((\lambda))$, then the Lax relation is equivalent to an infinite set of evolution equations. To get a finite system of PDEs we need some additional assumptions on the structure of L and A.

The basic ingredient for constructing of Lax pairs in $\mathcal{G}((\lambda))$ is a vector space decomposition

$$\mathcal{G}((\lambda)) = \mathcal{G}[[\lambda]] \oplus \mathcal{U}, \tag{1}$$

where $\mathcal{G}[[\lambda]]$ is the subalgebra of all Taylor series and $\mathcal{U}$ is a so called *factoring* Lie subalgebra.

We discuss main properties of factoring subalgebras and establish relations between them and algebraic curves. All non-equivalent factoring subalgebras for $G = so_3$ are found and an one-to-one correspondence with classical integrable models of the motion of a rigid body in an ideal fluid is described.

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Referências

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[2] Ostapenko V., **Endomorphisms of lattices of a Lie algebra over formal power series field**. C.R. Acad. Sci., 1992. Paris, **315**, Serie 1, p. 669–673.

[3] Golubchik I. Z. and Sokolov V. V. **Factorization of the loop algebra and integrable top-like systems**. Theoret. and Math. Phys., 2004, **141**(1), 1329–1347.