

Recent developments in the theory of integrable systems

11-th of April 2003 - Yukawa Institute for Theoretical Physics

Room K202

PROGRAM

- **M. Jimbo** - "*Counting minimal form factors of restricted sine Gordon model*"
9:30-10:10 am (with T.Miwa and Y.Takeyama).

We revisit the issue of counting all local fields of the restricted sine-Gordon model, in the case corresponding to a perturbation of minimal unitary conformal field theory. The problem amounts to the study of a quotient of certain space of polynomials which enter the integral representation for form factors. This space may be viewed as a q -analog of the space of conformal coinvariants associated with $U_q(\widehat{sl}_2)$ with $q = \sqrt{-1}$. We prove that its character is given by the restricted Kostka polynomial multiplied by a simple factor. As a result, we obtain a formula for the truncated character of the total space of local fields in terms of the Virasoro characters.

- **P. Dorey** - "*Curiosities at $0 < q \leq 4$* "
10:10-10:50 am

This talk will describe some work with Andrew Pocklington and Roberto Tateo, on the S-matrix approach to the scaling regions of the critical and tricritical Potts models in two dimensions. Efforts to find the full mass spectrum using bootstrap techniques will be outlined, as will the surprising and so-far unexplained appearance of elements of a conjecture due to Deligne.

***** short break 20mns *****

- **P. Baseilhac** - “*Dynamical solutions of boundary Yang-Baxter equations*”
11:10-11:50 pm (with K. Koizumi)

The problem of finding new solutions of reflection equations (boundary Yang-Baxter equations) is revisited. Starting from $U_\eta(\widehat{sl}_2)$, these solutions can be obtained using a certain coideal subalgebra of $U_\eta(\widehat{sl}_2)$ (Nepomechie-Delius-MacKay). I will show that one can however extend nontrivially this coideal using a mixing between the Cartan subalgebra and a quartic algebra based on the Heisenberg one $[\hat{p}, \hat{q}] = i\hbar(\eta)$, leading to new solutions to the reflection equations. For general q , it possesses infinite dimensional representation. For q a root of unity, it possesses (cyclic) finite dimensional representations constructed explicitly. These different solutions are the basics elements to construct new integrable systems with boundary degrees of freedom (sine-Gordon field theory on the half-line, XXZ and XX open spin chains and $N = 2$ supersymmetric boundary models).

- **K. Hikami** - “*Knot Invariant and Hyperbolic Geometry*”
11:50-12:30 am

I will talk about some topics on ”volume conjecture”, which relates Kashaev invariant with hyperbolic volume of knot.

***** LUNCH BREAK *****

- **W-L. Yang** - “*Eigenvalues of Ruijsenaars-Schneider models*”
14:00-14:40 pm associated with A_{n-1} root system”
(with B.Y. Hou and R. Sasaki)

Using algebraic Bethe ansatz method, we obtain the spectrum of all types (elliptic, trigonometric, rational ones) of Ruijsenaars-Schneider models associated with A_{n-1} root system. The corresponding eigenvalues are written in terms of Bethe ansatz formulas.

• **R. Tateo** - “*PT-symmetric quantum field theory*”

14:40-15:20 pm

I will discuss aspects of PT-symmetric quantum field theory and review a recently-discovered connection between integrable models and ordinary differential equations.

***** short break 20mns *****

• **J-F. Gomes** - “*Axial Vector Duality in Affine Non Abelian Toda Models*”

15:40-16:20 pm

A general and systematic construction of Non Abelian affine Toda models is proposed in terms of its underlying Lie algebraic structure. Such class of two dimensional integrable models naturally leads to the construction of a pair of actions (axial and vector) which are shown to be related by duality transformations.

Organizers:

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