

Short Visit Application
Quantum spectral curves and Manin Matrices
Aim of the Visit

The purpose of the visit to Angers is to deepen the study, with V. Rubtsov and A. Chervov, of the algebraic properties of "quantum spectral curves" or "quantum characteristic polynomial" of Lax operators $L(z)$ associated with quantum spin integrable systems.

The relevance of such a notion – that in some form was already present in the pioneering works of Sklyanin et. al. about R -matrices – was brought to the light in recent papers by D. Talalaev and A. Chervov.

In a recent paper by A. Chervov and myself (the first mentioned paper in the list of page 2) the relevance of the notion of "Manin Matrix" in this set up was highlighted, and basic properties discussed. Also, some "applications" were given, mainly in the case of rational r -matrix structures. Further results in this issue are being obtained by Rubtsov and Talalaev in the elliptic case.

We plan to:

- a) Complete the preparation of a joint paper about further algebraic properties of Manin matrices (containing, e.g., the appropriate version of Schurs formula for complements and Jacobis ratio theorem, the Aronszain-Weinstien formula, Plucker relations and so on and so forth).
- b) Discuss possible applications to the problem of quantum separation of variable problem (that is, Baxter T-Q equation). We already have several ideas about this problem, that – in my opinion – deserve to be discussed together with my collaborators.

Host details:

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Gregorio FALQUI

Brief Curriculum vitæ et studiorum

Personal Data:

- Born April, 15th, 1960
- Degree in Physics, University of Milano, 1985.
- Ph. D. in Mathematical Physics, SISSA – Trieste, 1990
- *Ricercatore*, SISSA – Trieste (1994)
- Associate Professor, SISSA – Trieste (2002)
- Associate Professor, Università di Milano–Bicocca, (2005).

Reserch Interests

- Algebraic Integrability, Separation of Variables, and quantization.
- Hamiltonian aspects of systems of KdV type.
- Geometry of Integrable Systems.
- W-Algebras, higher genus Toda theories, and Higgs–Hitchin systems.

Research Activity

I am the (co)-author of some 40 research papers. Among the most recent:

- A. Chervov, G. Falqui, *Manin matrices and Talalaev's formula*, J. Phys. A: Math. Theor. **41** No 19 (16 May 2008) 194006 (28pp).
- G. Falqui, F. Musso, *Quantisation of bending flows*, Czech. J. Phys. **56** (2006) 1143-1148.
- G. Falqui, F. Musso, *On Separation of Variables for Homogeneous $SL(r)$ Gaudin Systems*, Math. Phys. Anal. Geom. **9** (2006), 233-262
- G. Falqui, *On a Camassa-Holm type equation with two dependent variables*, J.Phys. A: Math. Gen. **39** (2006), 327–342.
- G. Falqui, M. Pedroni, *Gel'fand-Zakharevich Systems and Algebraic Integrability: the Volterra Lattice Revisited*, Reg. & Chao. Dyn., **10** (2005), 399–412

C. Bartocci, G. Falqui, M. Pedroni, *A geometric approach to the separability of the Neumann-Rosochatius system*. SISSA preprint 62/2003/FM, Diff. Geom. Appl.**21** (2004), 349–260.

I gave some 30 talks and seminars. Among the most recent:

Będlewo, "30 Years of bihamiltonian systems", August 2008

Praha, "Integrable Systems and Quantum Symmetries", June 2008.

Stockholm, "Enigma Conference on Mathematical Physics", June 2007

Hanoi, Conference "Geometry of Integrable Systems", April 2007.

Colmenarejo (Madrid) Workshop "Integrable Systems in Applied Mathematics" September 2006.

I currently am a participant of the ESF Recherche programme MISGAM, and of the Marie Curie FP6 RTN "ENIGMA".