

A short visit grant from MISGAM would make it possible for me to visit Prof. Giovanni Felder and Prof. Jens Hoppe at ETH Zürich. The aim of the visit is to discuss, and collaborate on, supersymmetric matrix models. Various approaches to the understanding of these models will be discussed, not only together with Giovanni Felder and my advisor Jens Hoppe (who will be guest professor at ETH during the spring), but also with Gian Michele Graf (whom I met at the ENIGMA-MISGAM summer school “Aspects of Membrane Dynamics”, and recently also corresponded with), Jürg Fröhlich, and Ruedi Suter (with whom I discussed at KTH a couple of weeks ago).

Our main approaches to the problem are:

I. Group averaging methods

II. Explicit construction, near the origin, of the Spin(9)-invariant eigenfunction using representation theory

III. Weighted Hilbert spaces and index theory

Curriculum Vitae for Douglas Lundholm

Personal Data

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Education

2006 M. Sc. in Engineering Physics (Civilingenjör i Teknisk Fysik), KTH

Positions

2006-present Ph.D. Student

Dept. of Math., KTH

2006 Spring Forskaringenjör

Dept. of Math., KTH

Languages

English, Swedish

Research Interests

Mathematical physics: Clifford algebras and their applications, supersymmetric quantum mechanical systems (in particular matrix models), quantum gravity.

Publications

Submitted publications and preprints

- [7] Spin(9) Average of SU(N) Matrix Models I. Hamiltonian,
(with J. Hoppe and M. Trzetrzelewski)
submitted. arXiv:0809.5271
- [6] Construction of the Zero-Energy State of SU(2)-Matrix Theory: Near the Origin,
(with J. Hoppe and M. Trzetrzelewski)
submitted. arXiv:0809.5270
- [5] Octonionic twists for supermembrane matrix models, (with J. Hoppe and M. Trzetrzelewski)
submitted. arXiv:0803.1316

Publications in journals

- [4] On the Geometry of Supersymmetric Quantum Mechanical Systems,
J. Math. Phys. 49, 062101 (2008).
- [3] Dynamical Symmetries in Supersymmetric Matrix Models, (with V. Bach and J. Hoppe)
Documenta Math. 13 (2008) 103-116.

Other publications

- [2] On the Construction of Zero Energy States in Supersymmetric Matrix Models IV,
(with J. Hoppe). arXiv:0706.0353
- [1] M.Sc. Thesis: “Geometric (Clifford) algebra and its applications”,
Trita-MAT. MA, ISSN 1401-2278; 2006:01, Supervisor: Lars Svensson.
arXiv:math/0605280

Talks

- 2008, May “On the geometry of supersymmetric quantum mechanical systems” at the conference
ICCA8, Campinas, Brazil
- 2007, June “Dynamical symmetries in supersymmetric matrix models” at the conference AMD,
KTH, Stockholm
- 2006, Nov “Supersymmetric Matrix Models”, University of Mainz, Germany

Conferences

- 2008, Oct ENIGMA 2008 Conference on Integrable Systems, Geometry, Matrix Models and
Applications, SISSA – Trieste, Italy
- 2008, May The 8th International Conference on Clifford Algebras (ICCA8) and their Applications
in Mathematical Physics, IMECC – UNICAMP, Campinas, Brazil
- 2007, June ENIGMA Conference on Mathematical Physics, KTH, Sweden
- 2007, June Midsummer School: Aspects of Membrane Dynamics, KTH, Sweden