

# Computer Algebra Challenges from Integrable non-abelian Laurent ODEs

*Thomas Wolf and Eberhard Schrufer*

With examples of integrable matrix homogeneous ODE-systems, Dr. Wolf and Dr. Schrufer will discuss non-abelian Laurent polynomials and an ODE-system of Kontsevich which they study for integrability.

Further studies towards the classification of such ODE systems and the investigation of Lax pairs of a given system lead to challenging bi-linear algebraic systems for undetermined coefficients to solve. To compute symmetries of order up to 15 for the Kontsevich system, linear algebraic systems with over 330 million equations for 60 million undetermined coefficients had to be solved.

Dr. Wolf and Dr. Schrufer will discuss the new algorithms that have made these computations possible, the necessary extensions of the computer algebra system with comparisons to other computer algebra systems, and the SHARCNET hardware that was used in the process.

**FRIDAY OCTOBER 15, 2010 at 12:30 PM**

**Plaza 410 | Brock University**

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*SHARCNET is pleased to help sponsor  
Dr. Eberhard Schrufer's visit to  
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