THE FIELDS INSTITUTE
FOR RESEARCH IN MATHEMATICAL SCIENCES

ABSTRACTS 1.2

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Gröbner bases and their applications for some noncommutative algebras(25-30)

In this talk we will discuss symbolic computation algorithms in the wide class of noncommutative algebras (Gröbner–ready algebras, sometimes also called algebras of solvable type or PBW–algebras), with universal enveloping algebras and their quantized counterparts as motivating examples. We will concentrate on the Gröbner bases theory, its applications and the implementation in the computer algebra system SINGULAR::PLURAL. Some applications to representation theory will be given in details.
We work with modules, which are submodules of free modules of finite rank. In particular, the following algorithms will be mentioned:

- left Gröbner basis of a left module M
- left Gröbner basis of a two–sided module T
- left Gröbner basis of a syzygy module of M
- free resolution of a module
- intersection of a module with a subalgebra
- algebraic dependence of polynomials
- maximal two–sided ideal contained in a given left ideal
- all algorithms above also in factor–algebras

Please visit the SINGULAR Homepage at `http://www.singular.uni-kl.de`.