Atlantic Association for the Research in Mathematical Sciences

Memorial University of Newfoundland

Department of Mathematics and Statistics

Atlantic Algebra Centre

Professor Dr Gerhard Pfister

University of Kaiserslautern, Germany

Visiting from October 3, 2010 – October 10, 2010

AAC Mini Course

"Computing in Commutative Algebra"

(Schedule and Contents of the mini course on the next page)

Distinguished Colloquium

"SINGULAR and Applications"

(Wednesday, October 6, 2010, 1 – 2 pm, HH-3017)

First lecture: ***Gröbner bases and SINGULAR***

Monday, October 4, 2010, 10-10:50 a.m., C-2010

The notion of a Gröbner basis (with respect to any ordering) will be explained as the basis for computations in localizations of factor-rings of polynomial rings. The computer algebra system SINGULAR and its use will be explained as a basis for further applications in commutative algebra and other fields.

Second lecture: ***Polynomial solving and primary decomposition***

Tuesday, October 5, 2010, 10-10:50 a.m., SN-3060

Triangular sets as a symbolic pre-processing to solve polynomial systems of equations will be discussed. The computation of a primary decomposition – one of the most difficult task in computer algebra – will be explained. The computation of the normalization of a ring will be included.

Third lecture: ***Invariants***

Thursday, October 7, 2010, 10-10:50 a.m., A-1049

The computation of many invariants in commutative algebra as Hilbert function, Hilbert polynomial, dimension, degree, multiplicity will be discussed and explained.

Fourth lecture: ***Homological Algebra***

Friday, October 8, 2010, 10-10:50 a.m., SN-3060

Important notions in homological algebra as for instance depth and Cohen-Macaulayness will be analyzed and it will be explained how to check and respectively compute it.

Discussions and Coffee after each lecture in AAC room HH-2010