NON-COMMUTATIVE DEFORMATIONS. APPLICATIONS TO MATHEMATICS AND PHYSICS.

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Abstract.

Classical deformation theory furnishes a method to compute the *local ring* of the moduli space of the objects we are studying, if this moduli space exists. Non-commutative deformation theory, is a generalization of ordinary deformation theory of representations (modules) of k-algebras, k a field, to the case of associative non-commutative algebras, and finite *families of modules*. This generalization, to deforming *families* of objects, is necessary, if one wants to establish a non-commutative algebraic geometry, since it is easy to see that such a geometry cannot be determined by its purely local structure.

I shall explain how non-commutative deformation theory is already part of contemporary mathematics, playing an important role in many fields, like in algebraic geometry, in invariant theory, and in the so called, representation theory. If time permits, I shall also sketch a mathematical model for quantum field theory, based on non-commutative algebraic geometry.

The main ideas have been treated in the papers listed below.

References

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[3] O. A. Laudal: The structure of $Simp_n(A)$. Proceedings of NATO Advanced Research Workshop, Computational Commutative and Non-Commutative Algebraic Geometry. Chisinau, Moldova, June 2004.(See also: Preprint, Institut Mittag-Leffler, 2003-04.)

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