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Mutations in Algebra

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Categories appearing in representation theory, such as modules over an algebra, and algebraic geometry, such as (quasi)coherent sheaves over a scheme, often share common features. A revealing example of this phenomenon is the equivalence, first established by Beilinson, between the bounded derived category of coherent sheaves over the n-dimensional projective space and the bounded derived category of finite-dimensional modules over a certain finite dimensional algebra with n simple modules. This equivalence is governed by a so-called (full and strong) exceptional collection of coherent sheaves and an associated tilting sheaf.

This idea of having objects, or collections of objects, establishing a connection between two different categories is an important theme in algebra. In this talk, we focus on an algorithmic process, known as mutation, which from such an object (or collections of objects) produces another one. We will discuss the concept of mutation in some of its variants, including some recent developments concerning applications to the study of derived categories of modules over commutative noetherian rings. This talk is partly based on joint work with Sergio Pavon and on joint work with Lidia Angeleri Hügel, Rosanna Laking and Jan Stovicek.

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