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Mutation of Cluster-tilting Objects and Potentials

Motivated by the theory of cluster algebras initiated by Fomin and Zelevinsky (2002), Buan, Marsh and Reiten (2007) introduced via the notion of cluster categories the so-called cluster-tilted algebras. Through further papers, the ordinary quivers of cluster-tilted algebras were shown to be obtained by sequences of Fomin-Zelevinsky quiver mutations on acyclic quivers; but the nature of the relations on these quivers remained unknown.

On the other hand, there is a recent theory of mutation of quivers with potential initiated by Derksen, Weyman and Zelevinsky, and to which are associated algebras called Jacobian algebras. In this talk, we discuss the strong relationship between mutation of cluster-tilting objects in triangulated 2-Calabi-Yau categories and mutation of quivers with potentials. In particular, we show that cluster-tilted algebras are Jacobian algebras, solving (partially) the problem of finding the relations on cluster-tilted algebras.

This talk is based on a recent joint work with A. Buan, O. Iyama and I. Reiten.