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From Koszul Algebras to Calabi-Yau Algebras

This talk is based on my paper: Gerasimov's theorem and N-Koszul algebras, arXiv: 0801.3383. Various dualities for graded algebras will be presented: Koszul duality, AS-Gorenstein duality and Calabi-Yau duality, the latter being the strongest duality (AS stand for Artin and Schelter). Statements and proofs use homological algebra. The dualities will be illustrated by the graded algebras having a single quadratic relation. These algebras, studied in part by Michel Dubois-Violette, form a very interesting class for which basic objects can be explicitly computed.