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Recent advances in Gröbner basis algorithms and geometric applications by Christian Eder

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Abstract. The tasks of designing innovative mathematical software and of solving complex research problems using computational methods are strongly mutually dependent. Developing a new generation of algorithms to considerably push the computational boundaries of nonlinear algebra, notably addressing polynomial system solving, is thus envitable. One important task of this process is to no longer use Gröbner bases only as a black box in higher level algorithms, but to optimize their computation with the geometric context in mind. In this talk, we will illustrate this idea by presenting a new algorithm for computing Gröbner bases of saturated polynomial ideals. Moreover, we introduce msolve, an open source software package build to provide this new generation of efficient and optimized algorithms for the community. The contents of this talk are based on joint work with Jérémy Berthomieu and Mohab Safey El Din.