Canonical Gröbner cover for parametric polynomial systems

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Gröbner bases are the computational method par excellence for studying polynomial systems. In the case of parametric polynomial systems one has to determine the reduced Gröbner basis in dependence of the values of the parameters. I will present the algorithm GRÖBNERCOVER which has as input a finite set of parametric polynomials and outputs a finite partition of the parameter space into locally closed subsets together with polynomial data, from which the reduced Gröbner basis for a given parameter point can immediately be determined. The partition of the parameter space is intrinsic and particularly simple if the system is homogeneous.

The usefulness of the algorithm will be seen in an interesting example of automatic theorem discovery (Extended Steiner Lehmus Theorem).