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Computing the canonical representation of constructible sets

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Constructible sets are needed in many algorithms of Computer Algebra, particularly in the Gröbner Cover and other algorithms for parametric polynomial systems. We review the canonical form of constructible sets and give algorithms for computing it.
In the basic paper defining the Gröbner Cover (Montes-Wibmer, 2010) for discussing parametric polynomial systems of equations, we introduced algorithms that have been improved since then. We used our own algorithm BUILDTREE for computing the initial Comprehensive Gröbner System (CGS), needed for the Gröbner Cover, now substituted in the SINGULAR library "grobcov.lib" by the more efficient Kapur-Sun-Wang algorithm (2010). The algorithm GROBCOV used specially simple locally closed sets, whose union is certified to be also locally closed by Wibmer's theorem (2007) for which we used the adhoc algorithm LCUNION.
The Gröbner Cover is used for the automatic deduction of geometric theorems (Montes-Recio, 2014). It is also essential for computing geometrical loci and defining a taxonomy of the components of loci (Abánades, Botana, Montes, Recio, 2014) as well as for envelopes. In general in these tasks, the representation of locally closed sets, i.e. difference of varieties, is sufficient. But for more general applications,

where Wibmer's theorem is not applicable, the union of locally closed sets is not always locally closed. This is the reason for reviewing here the canonical representation of constructible sets giving algorithms to compute it, as well as to use the new algorithms inside the library for computing higher dimensional geometrical loci's.
Canonical form of constructible sets were already introduced by Allouche (1996), in the context of general topology. More recently, O'Halloran and Schilmoeller (2002) have given a description of invariant sequences for constructible sets in Zariski topology. The object of this paper is, taken this last description as starting point, to give formulas and algorithms for computing effectively the canonical form of constructible sets.
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