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Polyhedral Methods for Space Curves and Two Dimensional Surfaces Exploiting Symmetry.

We present a polyhedral algorithm to manipulate algebraic solution sets of dimension one and two. Using facet normals to Newton polytopes as pretropisms, we focus on the first two terms of a Puiseux series expansion. The leading powers of the series are computed via the tropical prevariety. This polyhedral algorithm is well suited for exploitation of symmetry, when it arises in systems of polynomials. Initial form systems with pretropisms in the same group orbit are solved only once, allowing for a systematic filtration of redundant data. Computations with cddlib and Sage are illustrated on cyclic n-roots polynomial systems. (Received September 21, 2011)