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*Equiprojectable decomposition of zero-dimensional varieties*

Equidimensional decompositions of algebraic varieties, such as triangular decompositions, are used for many situations. However, even a zero-dimensional variety $V$ may have several triangular decompositions. The *a priori* canonical choice, namely the irreducible decomposition of $V$, does not have good specialization properties.

Given a variable ordering, we introduce the equiprojectable decomposition of $V$. This is a canonical equidimensional decomposition of $V$ with good computational properties. We show how to compute the equiprojectable decomposition of $V$ from any triangular decomposition or primitive element representation of $V$.

Given a zero-dimensional polynomial system $F$ over $Q$, we show that there exists an integer $A$ whose height is softly in the order of the square of the Bezout number of $F$, such that any prime number not dividing $A$ is a good prime for specializing the equiprojectable decomposition of $F$.

Using Hensel lifting techniques, we deduce a modular algorithm for computing the equiprojectable decomposition of zero-dimensional varieties over $Q$. We have realized a preliminary implementation with the Triade library developed in Maple by F. Lemaire. Our theoretical results are comforted by these experiments.

Joint work with Xavier Dahan, Eric Schost, Wenyuan Wu and Yuzhen Xie.