Mathematics > Algebraic Geometry

Interpolation of Ideals

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Let K denote an algebraically closed field. We study the relation between an ideal I in K[x1,...,xn] and its cross sections I_a=I+<x1-a>. In particular, we study under what conditions I can be recovered from the set I_S={(a,I_a):a in S} with S a subset of K. For instance, we show that an ideal I=cap_i Q_i, where Q_i is primary and Q_i cap K[x1]={0}, is uniquely determined by I_S when S is infinite. Moreover, there exists a function B(d,n) such that, if I is generated by polynomials of degree at most d, then I is uniquely determined by I_S when |S|>=B(d,n). If I is also known to be principal, the reconstruction can be done when |S|>=2d, and in this case, we prove that the bound is sharp.

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