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Susan Cooper, Brian Harbourne and Zach Teitler* (zzeitler@tamu.edu), Texas A&M University, TAMU 3368, Department of Mathematics, College Station, TX 77843. *Bounding Hilbert functions of fat point schemes.*

Let A be a fat point scheme in the plane. Typically one knows a set of curves that pass through some of the points of support of A . For example, one might know which sets of points in the support of A are collinear. We demonstrate how to use this information to give upper and lower bounds for the Hilbert function of A . This leads to surprisingly good bounds and even a simple criterion for when the bounds coincide, so in many cases we get an exact computation of the Hilbert function of A .

The technical idea is an inductive reduction: We reduce A along one of the lines passing through points of A , and relate the Hilbert function of A with the Hilbert function of the reduced scheme. In low degrees, this inductive step is simply Bézout's theorem. The extension to arbitrary degrees is still elementary, and well-illustrated by examples. (Received August 05, 2008)