

ATELIER « COMPTAGE DE POINTS : THÉORIE, ALGORITHMES ET PRATIQUE »
19–23 AVRIL 2010

WORKSHOP ON COUNTING POINTS: THEORY, ALGORITHMS AND PRACTICE
APRIL 19–23, 2010

Computing zeta functions for sparse hypersurfaces using Dwork cohomology

John Voight

Department of Mathematics
University of Vermont
16 Colchester Avenue, Rm 207C
Burlington, VT 05401
USA

jvoight@gmail.com

We use the cohomology theory of Dwork, as developed by Adolphson and Sperber, to give an algorithm to compute the zeta function of a nondegenerate hypersurface. This algorithm seems especially well-suited for “sparse” hypersurfaces, those for which the number of nonzero monomials is small relative to the degree of the hypersurface. Our method applies equally well to toric, affine, and projective hypersurfaces, as well as to the case of exponential sums.

This is joint work with Steven Sperber.