1158-11-370 **Daniel J. Katz*** (daniel.katz@csun.edu), Department of Mathematics, California State University, Northridge, 18111 Nordhoff Street, Northridge, CA 91330-8313. *A new generating function for calculating the Igusa local zeta function.*

Consider a polynomial $f(x_1, \ldots, x_n)$ with integer coefficients. Let p be a prime and k a positive integer let $N_k(f)$ be the number of zeroes in $(\mathbb{Z}/p^k\mathbb{Z})^n$ of f modulo p^k. The Igusa local zeta function Z_f is a generating function that organizes these zero counts for all k. Its poles tell us about the p-divisibility of the counts. More generally, f can have coefficients in a ring R of integers of a p-adic field, and the Igusa local zeta function for f organizes the counts $N_k(f)$ of zeroes of f modulo π^k, where π is a uniformizing parameter for R.

We devise a new method for calculating the Igusa zeta function via a new kind of generating function G_f, which is a projective limit of a family of generating functions, and contains more data than the local zeta function. Our G_f resides in an algebra whose structure is naturally compatible with operations on the underlying polynomials, thus facilitating calculation of local zeta functions. This new method enables us to calculate Igusa local zeta functions for a much wider range of quadratic polynomials over 2-adic fields than have been determined previously. (This is joint work with Raemeon A. Cowan and Lauren M. White.) (Received March 03, 2020)