1145-13-422 **Manuel González-Sarabia*** (mgonzalezsa@ipn.mx), Instituto Politécnico Nacional, UPIITA, Av. IPN 2580, Barrio La Laguna, Ticomán, Delegación Gustavo A. Madero, 07340 Ciudad de México, Mexico, and **José Martínez-Bernal**, **Rafael H. Villarreal** and **Carlos E. Vivares**.
Generalized Minimum Distance Functions.

Using commutative algebra methods we study the generalized minimum distance function (gmd function) and the corresponding generalized footprint function of a graded ideal in a polynomial ring over a field. The number of solutions that a system of homogeneous polynomials has in any given finite set of projective points is expressed as the degree of a graded ideal. If $\mathbb{X}$ is a set of projective points over a finite field and I is its vanishing ideal, we show that the gmd function and the Vasconcelos function of I are equal to the r-th generalized Hamming weight of the corresponding Reed-Muller-type code $C_{\mathbb{X}}(d)$ of degree d. We show that the generalized footprint function of I is a lower bound for the r-th generalized Hamming weight of $C_{\mathbb{X}}(d)$. To give applications of our lower bound to algebraic coding theory, we show an interesting integer inequality. Then we show an explicit formula and a combinatorial formula for the second generalized Hamming weight of an affine cartesian code. (Received September 05, 2018)