

New LS[3][2,3,2⁸] Geometric Large Sets
Michael Epstein, Michael Hurley*, Bal Khadka, Spyros Magliveras
Department of Mathematical Sciences, Florida Atlantic University
Boca Raton, FL 33431
mhurley6@fau.edu

Let V be an n -dimensional vector space over the field of q elements. By a *geometric* $t - [q^n, k, \lambda]$ design we mean a collection \mathcal{D} of k -dimensional subspaces of V , called blocks, such that every t -dimensional subspace T of V appears in exactly λ blocks in \mathcal{D} . In a recent paper Braun, Kohnert, Östergard, and Wasserman constructed the first ever known large set LS[N][2, k, q^n], namely an LS[3][2,3,2⁸] under a cyclic group G of order 255. In this work we construct an additional 9 large sets with the same parameters and procedure, using the L^3 algorithm for lattice basis-reduction, as well as large sets found with linear programming, all of which are non-isomorphic to each other.

Keywords: Geometric t-Design, Lattice Basis-Reduction, Linear Programming, Large Sets