Abstract

Construction of q-analogs of combinatorial designs

Stefanie Braun

Universität Bayreuth
95440 Bayreuth

A $t-(v, k, \lambda; q)$ design can be found by solving a system of diophantine equations. For increasing parameters t and k the incidence matrix of the design grows exponentially with the result that the system of equations cannot be solved anymore. To reduce the number of entries of the incidence matrix a group of automorphisms is prescribed, which is known as the Kramer-Mesner method. We present algorithms based on the homomorphism principle and the laddergame which compute the orbits of the prescribed group on the t- and k-dimensional subspaces of $GF(q)^v$ in order to construct the Kramer-Mesner matrix. Thereby the prescribed group of automorphisms is generated by the Schreier-Sims algorithm for matrix groups. We give a list with the parameters of the new found q-analogs of combinatorial designs.