

Enumeration of self-orthogonal Latin squares

M. Kidd*, A. Burger and J. van Vuuren

University of Stellenbosch

14623617@sun.ac.za, apburger@sun.ac.za, vuuren@sun.ac.za

SAMS Subject Classification: Combinatorics and Graph Theory

The enumeration of self-orthogonal Latin squares (SOLS) of a given order seems to be an open problem in the literature on combinatorial designs. The existence of at least one SOLS is guaranteed for any order except 2, 3 and 6, but it is not known how many of these squares of a given order exist. In this talk we present enumeration tables of unequal SOLS, idempotent SOLS, isomorphism classes of SOLS and isotopy classes of SOLS. The isotopy classes are enumerated by an (almost) exhaustive computerised tree search which generates a representative from each isotopy class, whereafter the automorphism groups of these representatives are used together with results from abstract algebra in order to enumerate unequal SOLS, idempotent SOLS and isomorphism classes of SOLS. Finally, the results are validated by using an alternative computerised tree search method for all four classes of SOLS. The results appear as sequences A160365, A160366, A160367 and A160368 in Sloane's Online Encyclopedia of Integer Sequences [1].

References

- [1] Sloane N, *The online encyclopedia of integer sequences*, [Online], [Cited February 2nd, 2009], 1995
Available from <http://www.research.att.com/~njas/sequences>