
TOMMASO TRAETTA, Università di Brescia

Highly symmetric Kirkman triple systems

Kirkman triple systems (KTSs) are among the most popular combinatorial designs and their existence has been settled a long time ago. Yet, in comparison with Steiner triple systems, little is known about their automorphism groups. In particular, there is no known congruence class representing the orders of a KTS with a number of automorphisms at least close to the number of points. We fill this gap by proving that whenever $v \equiv 39 \pmod{72}$, or $v \equiv 4^e 48 + 3 \pmod{4^e 96}$ and $e \geq 0$, there exists a KTS on v points having at least $v - 3$ automorphisms.

To obtain these results we introduced new types of difference families and difference matrices which will be discussed in this talk.

This is joint work with S. Bonvicini, M. Buratti, M. Garonzi, and G. Rinaldi.