

A few new triplanes

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An incidence structure $\mathcal{D} = (\mathcal{P}, \mathcal{B}, I)$, with point set \mathcal{P} , block set \mathcal{B} and incidence I is a t - (v, k, λ) design, if $|\mathcal{P}| = v$, every block $B \in \mathcal{B}$ is incident with precisely k points, and every t distinct points are together incident with precisely λ blocks. We consider triplanes, i.e. symmetric block designs with $\lambda = 3$. Triplanes of order 12, i.e. symmetric $(71, 15, 3)$ designs, have the greatest number of points among all known triplanes and it is not known if a triplane $(v, k, 3)$ exists for $v > 71$.

In this talk, in addition to reviewing previously known results, we give the first example of a triplane of order 12 that doesn't admit an automorphism of order 3.

References

- [1] D. Crnković, D. Dumičić Danilović, S. Rukavina, Enumeration of symmetric $(45, 12, 3)$ designs with nontrivial automorphisms, *J. Algebra Comb. Discrete Struct. Appl.* 3 (2016), 145–154.
- [2] D. Crnković, S. Rukavina, L. Simčić, On triplanes of order twelve admitting an automorphism of order six and their binary and ternary codes, *Util. Math.* 103 (2017), 23–40.