A few new triplanes

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An incidence structure $D = (P, B, I)$, with point set $P$, block set $B$ and incidence $I$ is a $t$-$(v, k, \lambda)$ design, if $|P| = v$, every block $B \in B$ is incident with precisely $k$ points, and every $t$ distinct points are together incident with precisely $\lambda$ 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
