Salwach, Chester J.
On generalized Steiner systems and semi-biplanes. (English) Zbl 0568.51013

An incidence structure \( S = (P, B) \) is called an homogeneous 3-\((v,\{4,6\},1)\) generalized Steiner system if the following conditions are satisfied: (i) blocks have size 4 or 6, (ii) any three distinct points are contained in exactly one block, (iii) both the collection of 4-subsets and the collection of 6-subsets form 1-designs, and (iv) \(|P| = v\) and there are exactly \(v\) blocks of size 6.

The search for all possible homogeneous 3-\((20,\{4,6\},1)\) generalized Steiner systems does not seem to be within the scope of present-day computers. However, the author has discovered, with the aid of a computer, all possible homogeneous 3-\((20,\{4,6\},1)\) generalized Steiner systems whose 1-\((20,6,6)\) design is a semi-biplane: there exist precisely two such systems which are both new.

Here the author uses a result of P. Wild establishing the existence of exactly two semi-biplanes on 20 points.

Reviewer: J.A. Thas

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51E10 Steiner systems in finite geometry

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