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Symmetric designs and strongly regular graphs constructed from the group PSp(4,3)

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Abstract

We present a symmetric (45,12,3) design, two symmetric (40,13,4) designs, and a symmetric (36,15,6) design constructed from the symplectic group PSp(4,3) defining an incidence relation on the conjugacy classes of the maximal subgroups. Incidence matrices of these designs are adjacency matrices of strongly regular graphs with parameters (45,12,3,3), (40,12,2,4) and (36,15,6,6), respectively. The group PSp(4,3) acts transitively on the constructed designs and the corresponding strongly regular graphs.

Key words: symmetric design, strongly regular graph, symplectic group, automorphism group.

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