

Primitive Designs Constructed from Simple Groups

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(joint work with Dean Crnković)

Let G be a finite permutation group acting primitively on sets Ω_1 and Ω_2 . We describe a construction of a 1-design with the block set Ω_1 and the point set Ω_2 , having G as an automorphism group.

In particular, a simple group G act primitively on a conjugacy class of a maximal subgroup and, therefore, we can construct 1–designs from the group G .

Applying this method, we construct simple block designs with parameters $(31, 6, 1)$, $(31, 6, 100)$, $(31, 10, 300)$, $(31, 15, 700)$, $(31, 3, 25)$, $(31, 12, 550)$ and $(31, 15, 875)$ from the group $L(3, 5)$. All constructed block designs have $L(3, 5)$ as the full automorphism group.

MSC2000: 05B05, 05E20, 05E30.

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