

Grid-block Designs and their Applications

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(joint work with Rucong Zhang, Gennian Ge, Alan C. H. Ling and Y. Mutoh)

Let V be a v -set and \mathcal{A} be a collection of $r \times c$ arrays with elements in V . Two elements of V are *collinear* if they are on the same grid line (row or column). A pair (V, \mathcal{A}) is called an $r \times c$ grid-block design of order v if every pair of two distinct elements of V is collinear exactly once. Therefore, an $r \times c$ grid-block design of order v exists if and only if the complete graph of order v , K_v , can be decomposed into the Cartesian product of two complete graphs K_r and K_c denoted by $G(r, c) = K_r \times K_c$.

Recently, we have shown the existence of $r \times 4$ grid-block designs with $r = 3, 4$ except for some special orders which are left unsettled. In this talk, I'll present some of the constructions used in obtaining these designs and also explain how to apply them in DNA library screening.

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