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Colourings of Group Divisible Designs

A group divisible design (GDD) consists of a set V of points, a set $\mathcal{G}$ of subsets of V called groups that partition V, and a set $\mathcal{B}$ of subsets of V called blocks such that each pair of points that does not occur together in a group occurs together in exactly one block. A colouring of a design is a labelling of its points with colours so that no block is monochromatic; i.e., it is a function $f : V \to C$ where C is a set of elements called colours, such that $|\{f(x) : x \in B\}| \geqslant 2$ for each $B \in \mathcal{B}$. The chromatic number of a design is the least number of colours for which the design admits such a colouring. We will discuss colourings of GDDs, particularly those for which each group has the same size g and each block has the same size k.

This is joint work with A.C. Burgess, P. Danziger, J.H. Dinitz and D.M. Donovan.