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Colourings of Kirkman triple systems

A δ-*colouring* of a Steiner triple system S is an assignment of δ colours to its points so that no triple has all its points of the same colour. The chromatic number of S is the minimum number of colours δ so that S admits a δ-colouring. While much is known regarding colourings of Steiner triple systems in general (in particular, there exists a δ-chromatic STS(v) for every sufficiently large admissible order v), little is known about colouring properties of resolvable triple systems.

A *Kirkman triple system* consists of a resolvable Steiner triple system together with a partition of its blocks into parallel classes. We show that for every integer $\delta \geq 3$, there exist infinitely many δ-chromatic Kirkman triple systems. Moreover, in the case $\delta = 3$, we give a complete existence result for 3-chromatic Kirkman triple systems.

This is joint work with Nicholas Cavenagh, Peter Danziger and David Pike.