

Institut für Diskrete Mathematik

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SR 1 Geometry Institute, Kopernikusgasse 24

Set-colouring Ramsey numbers

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The set-colouring Ramsey number $R_{r,s}(k)$ is defined to be the minimum n such that if each edge of the complete graph K_n is assigned a set of s colours from $\{1, \dots, r\}$, then one of the colours contains a monochromatic clique of size k . The case $s = 1$ is the usual r -colour Ramsey number, and the case $s = r - 1$ was studied by Erdős, Hajnal and Rado in 1965, and by Erdős and Szemerédi in 1972. For general s , recent progress was made by Conlon, Fox, He, Mubayi, Suk and Verstraëte (CFHMSV), who proved lower and upper bounds which imply that $R_{r,s}(k) = 2^{\Theta(kr)}$ if s/r is bounded away from 0 and 1, but which can diverge significantly when $s = r - o(r)$.

In this talk, we will describe some of the previous constructions and proofs mentioned above, as well as a new (random) colouring which matches the upper bound of CFHMSV up to polylogarithmic factors in the exponent for essentially all r , s and k .

Joint work with Lucas Aragão, João Pedro Marciano, Taísa Martins and Rob Morris.

Joshua Erde, Mihyun Kang