Multicoloured Containers and Graphon Entropy (Part I)

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Container theory is an exciting new tool in combinatorics, developed in recent papers by Saxton and Thomason [1] and Balogh, Morris and Samotij [2]. One of the main applications of containers is proving counting results for hypergraphs, for example the number of H-free graphs on n vertices for a fixed hypergraph H. We extend the container results by Saxton and Thomason [1] to find multicoloured containers for families of k-colourings of the edges of graphs. Our results allow us to apply container theorems in a more general setting, such as in the context of digraphs and families of graphs characterised by some hereditary property.

Keywords: containers, hereditary properties

[1] Saxton, D., Thomason, A. Hypergraph containers. *Invent. Math.* 201 (2015), no. 3, 925-992.
[2] Balogh, J., Morris, R., Samotij, W. Independent sets in hypergraphs. *J. Amer. Math. Soc.* 28 (2015), no. 3, 669–709.