

Limits of sequences of Latin squares

Abstract

We introduce a limit theory of Latin squares, paralleling the recent limit theories of dense graphs and permutations. The space of limit objects - so-called Latinons, are certain distribution-valued two variable functions. Left-convergence to these are defined via densities of k by k subpatterns. The main result is a compactness theorem stating that every sequence of Latin squares of growing orders has a Latinon as an accumulation point. Furthermore, we show (via Keevash's recent results on combinatorial designs) that the space of Latinons is minimal, that is every Latinon can be approximated by Latin squares. We also introduce an appropriate version of cut-distance and prove counterparts to the counting lemma, sampling lemma and inverse counting lemma. This is joint work with Frederik Garbe, Jan Hladký and Maryam Sharifzadeh.