

Combinatorics Seminar

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The Oberwolfach Problem: Variations on a theme

Abstract

The *Oberwolfach Problem* was posed in the 1960s by Ringel as a seating problem: v people attend a conference in Oberwolfach, where the dining room has round tables of sizes m_1, m_2, \dots, m_t , where $m_1 + \dots + m_t = v$. Is it possible, over $(v-1)/2$ successive nights, to devise a seating plan in which each person sits next to each other person exactly once?

In other words, the Oberwolfach Problem asks whether, given a 2-factor F of order v , the complete graph K_v admits a 2-factorization in which each 2-factor is isomorphic to F . Such a factorization can exist only for complete graphs of odd order; for even v , a commonly studied variant (sometimes termed the *spouse-avoiding variant*) is to instead decompose $K_v - I$, the complete graph with the edges of a 1-factor removed, into subgraphs isomorphic to F .

In this talk, we first review the classical Oberwolfach Problem, and present some recent results obtained via graceful labellings. We then consider two natural variants of the problem, namely the *spouse-loving variant* (in which we decompose the complete graph with the edges of a 1-factor added into copies of a given 2-factor) and the *directed Oberwolfach Problem* (in which we decompose the complete symmetric digraph). In particular, we give a near-complete solution of the spouse-loving Oberwolfach Problem for uniform 2-factors, and solve the directed Oberwolfach Problem for uniform 2-factors with cycle length at most 50.

This talk contains joint work with Noah Bolohan, Iona Buchanan, Peter Danziger, Nevena Francetić, Mateja Šajna, Tommaso Traetta and Ryan Van Snick.