MASOOMEH AKBARI, University of Ottawa

On the Generalized Honeymoon Oberwolfach Problem

The Honeymoon Oberwolfach Problem (HOP) is one of the recent and interesting variations of the Oberwolfach Problem (OP). This problem was introduced by Sajna in 2019, and formulated as follows. We wish to make a seating arrangement for $2n$ participants consisting of n newlywed couples in a room with t round tables that, respectively, seat $2m_1, \ldots, 2m_t$ people so that all tables are full at each meal, that is, $2m_1 + 2m_2 + \ldots + 2m_t = 2n$, and each participant sits next to their spouse every time and next to each other participant exactly once. In graph theory, a solution to HOP is equivalent to a decomposition of $K_{2n} + (2n-3)I$, the complete graph on $2n$ vertices plus $2n-3$ additional copies of a 1-factor I, into 2-factors, each consisting of disjoint I-alternating cycles of lengths $2m_1, \ldots, 2m_t$. A number of cases of HOP have already been solved by Lepine and Sajna; most notably, the case of uniform cycle lengths.

So far, HOP has been defined with the constraint that each table size is at least four. In this talk, I generalize the problem to allow for tables of size two. A solution to the generalized HOP with s tables of size 2 and t round tables of sizes $2m_1, 2m_2, \ldots, 2m_t$ is equivalent to a decomposition of the multigraph $K_{2n} + (\gamma - 1)I$, for an appropriate integer γ, into subgraphs consisting of disjoint I-alternating cycles of lengths $2m_1, 2m_2, \ldots, 2m_t$ and s copies of K_2. I will present a general approach to this problem, and recent solutions to several cases.