Abstract

The Oberwolfach problem asks if it is feasible to produce $k$ seating arrangements of $n = 2k + 1$ ($2k + 2$) participants so that each person sits beside every other person exactly once, given tables of size $a_1,\ldots,a_m$ ($\sum a_i = n$, $a_i \geq 3$). Specifically, for odd $n$, $OP(n; a_1,\ldots,a_m)$ is feasible if and only if there exists a 2-factorization of $K_n$ where each 2-factor is isomorphic to $C_{a_1} \cup \cdots \cup C_{a_m}$. For even $n$, $OP(n; a_1,\ldots,a_m)$ is feasible if and only if there exists a 2-factorization of $K_n \setminus I$ where each 2-factor is isomorphic to $C_{a_1} \cup \cdots \cup C_{a_m}$ and $I$ is a perfect matching. Currently, the only instances known to be infeasible are $OP(6; 3,3)$, $OP(9; 4,5)$, $OP(11; 3,3,3)$, $OP(12; 3,3,3,3)$, and all other instances with $n \leq 17$ are feasible.

We demonstrate that $OP(n; \cdot)$ is feasible for $18 \leq n \leq 40$. This is joint work with A. Deza, F. Franek, M. Meszka, and A. Rosa.