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From Spouse-Avoiding to Spouse-Loving: Transforming Solutions to the Oberwolfach Problem

The Oberwolfach problem $OP(F)$, for a 2-factor F of K_n , asks whether there exists a 2-factorization of K_n (if n is odd) or $K_n - I$ (if n is even) where each 2-factor is isomorphic to F . Here, I denotes any 1-factor of K_n . For even n , the problem $OP(F)$ may also be denoted $OP^-(F)$, and has been nicknamed the spouse-avoiding variant. Similarly, the spouse-loving variant is denoted $OP^+(F)$ and asks for a 2-factorization of $K_n + I$ (the complete graph with the edges of a 1-factor I duplicated, rather than deleted) in which each 2-factor is isomorphic to F . To date, many more infinite families of cases of OP and OP^- have been solved than of $OP^+(F)$. In this talk, we show how certain solutions to OP^- can be used to construct solutions to $OP^+(F)$; in particular, when the number of odd cycles in F is not too large. Our technique of *setups* also allows us to completely solve the two-table OP^+ ; that is, $OP^+(F)$ where F has exactly two components.

This is joint work with Maruša Lekše.