Even pairs in Berge graphs

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An even pair in a graph is a pair of non-adjacent vertices so that every induced path between them has even length. A graph is called "Berge" if no induced subgraph of it is a cycle of odd length at least five or the complement of one. In my talk I will discuss two results, obtained in joint work with Paul Seymour, about even pairs in Berge graphs.

The first result is a a simplification of the proof of the Strong Perfect Graph Theorem (which we proved a few years ago in joint work with Neil Robertson, Paul Seymour and Robin Thomas). We were able to replace the last 55 pages of the proof (which are the least intuitive part of it) with a much shorter and simpler argument. This simplification is based on an approach by Maffray and Trotignon that allowed us to find even pairs in certain classes of Berge graphs.

The second is a result about even pairs in Berge graphs with no clique of size four. At the time this abstract is being written, we have not finished checking all the details, but we believe that we can prove a theorem that describes all K_4-free Berge graph that do not have even pairs.