Tuesday 9:00–10:00

Room 148

The Structure of Berge Graphs

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A *hole* in a graph means an induced cycle of length at least 4, and an *antihole* is an induced subgraph whose complement is a cycle of length at least 4. A graph is *Berge* if it has no odd holes or antiholes. Berge's *strong perfect graph conjecture* states that every Berge graph has chromatic number equal to the size of its largest clique, but that remains open. A great deal is known about the structure of a minimum counterexample to this conjecture, if one exists; but not so much is known about Berge graphs in general. This talk is a collection of conjectures, and some partial results, about the structure of Berge graphs. For instance, is there a reason why none of the natural classes of Berge graphs have both big holes and big antiholes?

Complicated Berge graphs show a tendency to admit *skew partitions* (a partition of the vertex set into four non-empty subsets A, B, C, D, so that there are no edges between A and B and every edge is present between C and D); and we have found some little Berge graphs so that every Berge graph containing one of our little ones must admit a skew partition. We sketch these results. This is joint work with Neil Robertson and Robin Thomas, and also partly with Jim Geelen and Carsten Thomassen.