

Induced subgraph obstructions to bounded treewidth

Tara Abrishami (Princeton University)

Treewidth is a graph parameter that roughly measures how “close to a tree” a graph is. Graphs with bounded treewidth have nice properties: for example, many algorithmic problems can be solved in polynomial time in graphs with bounded treewidth. Important graph classes, called hereditary graph classes, are defined by forbidden induced subgraphs; for this reason, we are interested in the relationship between forbidden induced subgraphs and treewidth. In this talk, we describe how to use well-chosen collections of separations to iteratively decompose graphs into less complicated graphs. In graphs with bounded degree, this method of iterated decompositions preserves the treewidth up to a constant factor. Using this approach, we prove that several hereditary graph classes with bounded degree have bounded treewidth.