Algorithmic Techniques for Edge Modification Problems

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In edge modification problems, one is given an arbitrary input graph and a target class of graphs and is asked to turn the input graph into any graph of the class by adding and removing as few edges as possible in the input graph. It turns out that for most target classes (even very simple ones), edge modification problems are usually NP-hard if one wants to compute the minimum number of modifications (additions and removals) needed to do so.

This mini-course intends to show some algorithmic techniques to deal with this difficulty of computation and to obtain results for very large instances of graphs encountered in practice. The target classes we will consider include cographs, chordal graphs and some of their subclasses, for which we will explore, in particular, polynomially-solvable relaxations of the problem and parameterized algorithms.