

EINLADUNG

Zeit: Dienstag, 19.02.2013, 16:00 Uhr

Ort: AH 1, Ahornstr. 55

Referent: Dipl.-Inform. Roman Rabinovich

Titel: Graph Complexity Measures and Monotonicity

Abstract:

The structural complexity of instances of computational problems has been an important research area in theoretical computer science in the last decades. Its success manifested itself in tree-width - a complexity measure for undirected graphs. Many practically relevant problems that are difficult in general, can be efficiently solved on graphs of bounded tree-width. For directed graphs, there are several similar measures, among others entanglement, directed tree-width, DAG-width and Kelly-width, that have shown their advantages as well as disadvantages.

In this talk, we speak about complexity measures for directed graphs that can be described in terms of graph searching games. A graph searching game is played on a given graph by a team of cops and a robber. The cops try to capture the robber whose intent is to escape. Precise rules define a game and a complexity measure on graphs. The complexity of a graph is usually the minimal number of cops needed to capture the robber. Hereby, an important issue is monotonicity, a property of winning cop strategies. It implies the existence of suitable decompositions of the given graphs which allow for efficient algorithms for difficult computational problems.

We discuss monotonicity issues of graph searching games, discuss problems appearing when monotonicity is introduced, and develop methods for solving those problems.

The crucial question about monotonicity is whether monotonicity costs, the number of additional cop needed to capture the robber monotonically, can be bounded by a constant. We analyse the only known example by Kreutzer and Ordyniak which shows that the monotonicity costs for DAG-width can be positive. Then we define a notion of weak monotonicity for DAG-width and investigate the problem of boundedness of weak monotonicity costs. Furthermore, we define a structural decomposition of graphs that corresponds to a winning cop strategy in a game with weak monotonicity.

Es laden ein: Die Dozenten der Informatik