Institut für Optimierung und Diskrete Mathematik

Vortrag im Seminar Diskrete Mathematik und Optimierung

18.3. 2014, 14:15

Seminarraum C208, Steyrergasse 30, 2. Stock

Approximation of the Quadratic Knapsack Problem

Joachim Schauer

(Institut für Statistik und Operations Research, Universität Graz)

We study the approximability of the classical quadratic knapsack problem (QKP) on special graph classes. In this case the quadratic terms of the objective function are not given for each pair of knapsack items. Instead an edge weighted graph $G = (V, E)$ whose vertices represent the knapsack items induces a quadratic profit p_{ij} for the items i and j whenever they are adjacent in G (i.e $(i, j) \in E$).

We show that the problem permits an FPTAS on graphs of bounded treewidth and a PTAS on planar graphs and more generally on H-minor free graphs. This result is shown by adopting a technique of Demaine et al. (2005). We also show strong NP-hardness of QKP on graphs that are 3-book embeddable, a natural graph class that is related to planar graphs.

(Joint work with Ulrich Pferschy)

Bettina Klinz