Oberseminar Theoretische Informatik
Wintersemester 2006/07

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A More Effective Linear Kernelization for Cluster Editing

Mo, 11.12.2006 um 14 Uhr (c.t.) im SR 226 (Carl-Zeiß-Str. 3, 2. Stock).

In the NP-hard Cluster Editing problem, we have as input an undirected graph G and an integer $k \geq 0$. The question is whether we can transform G, by inserting and deleting at most k edges, into a cluster graph, that is, a union of disjoint cliques. We first confirm a conjecture by Michael Fellows [IWPEC 2006] that there is a polynomial-time kernelization for Cluster Editing that leads to a problem kernel with at most $6k$ vertices. More precisely, we present a cubic-time algorithm that, given a graph G and an integer $k \geq 0$, finds a graph G' and an integer $k' \leq k$ such that G can be transformed into a cluster graph by at most k edge modifications iff G' can be transformed into a cluster graph by at most k' edge modifications, and the problem kernel G' has at most $6k$ vertices. So far, only a problem kernel of $24k$ vertices was known. Second, we show that this bound for the number of vertices of G' can be further improved to $4k$. Finally, we consider the variant of Cluster Editing where the number of cliques that the cluster graph can contain is stipulated to be a constant $d > 0$. We present a simple kernelization for this variant leaving a problem kernel of at most $(d + 2)k + d$ vertices.

Internetseite der Veranstaltung:
`http://theinf1.informatik.uni-jena.de/teaching/ws0607/oberseminar-ws0607`