Institut for Matematik og Datalogi — November 20, 2003
Syddansk Universitet — JFB

DM19 – Algorithms and Complexity – E03 – Lecture 12

Lecture, November 17

We will covered approximation algorithms from chapter 35 in the textbook, except for section 35.4.

Lecture, November 24

We will cover section 35.4 from the textbook and randomized rounding for MAX-SAT from a handout from Motwani and Raghavan's book *Randomized Algorithms*. We will also begin on brand-and-bound from the second set of notes.

Lecture, December 1

We will finish branch-and-bound from the second set of notes and begin on heuristics from the first set of notes.

Problems to be discussed in week 49

- 35.4-1, 35.4-2, 35.4-3, 35.3-4, 35.4-2.
- 35-2. (Note that these k-tuples can have repeated vertices.)
- A 0-1 integer linear programming formulation of MAX-SAT is as follows: Let F be a CNF formula with clauses $C_1, C_2, ..., C_m$. Let C_j^+ be the set of indices of vaiables that appear uncomplemented in clause C_j, and C_j^- be the set of indices of the complemented variables in C_j.

$$\text{minimize} \sum_{j=1}^{m} z_j$$

subject to

$$\sum_{i \in C_j^+} y_i + \sum_{i \in C_j^-} (1 - y_i) \geq z_j \quad (\forall j)$$

$$y_i, z_j \in \{0, 1\} \qquad (\forall i \text{ and } j)$$

In the linear relaxation, the variables y_i and z_j are only restricted to be in the interval $[0, 1]$. Why would one use randomized rounding here rather than simple rounding as for MAX-3SAT in the textbook?