Ex. session 23.5.13

May 13, 2013

1 Question 1

We would like to parameterize the problem SAT

1. What can we say about the following parameterization?
$$kSAT = \{(F,k)|F \text{ is a satisfiable } k-CNF \text{ formula}\}$$
2. Can we say something better about the suggested parameterizaion?
$$CNF-SAT = \{(F,k)|F \text{ is a satisfiable with } k \text{ varaibles}\}$$
3. Come up with additional parameter that keeps the problem in FPT.

2 Question 2

A question from the lecture concerns the following algorithm for the *Vertex-Cover* problem:

choose an arbitrary edge $e = \{u, v\}$ that has not yet been covered and branch on the two sub-cases; on one branch include u in the solution and in the other include v in the solution. Return the smaller of the two solutions. Does this algorithm run in FPT-time if parameterized by the size of the *Vertex-Cover?* If yes, provide a formal proof. If no, provide a counter example.

3 Question 3

Let $\mathcal{A}$ be a decidable parameterized problem. Show that $\mathcal{A}$ is fixed-parameter tractable if and only if there exists a kernelization algorithm for it.