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Complexity of Boolean functions

SS 2018

Homework 4

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Exercise 1:

Prove that each prime implicant of a monotone function $f \in M_n$ contains only nonnegated variables.

Exercise 2:

Prove Theorem 3.1 of the lecture.

Exercise 3:

Let $g = res_{\beta}(v)$ for a gate v in a monotone network β for the function f . Prove the following assertions:

- a) g can be replaced by the constant zero iff for all $t \in PIM(g)$ for all monomials t' there holds $tt' \notin PIM(f)$.
- b) g can be replaced by the constant one iff for all functions h there hold $gh \leq f$ implies $h \leq f$.