

Math 387

Homework 7

Due Monday, November 26

Practice exercises from the book

8.20, 8.21, 8.22, 8.27

Problems

1. Let A be the language of properly-nested parentheses. For example, A contains $()$ and $()(())$ but not $()()$. Show that A is in L .
2. Recall that $A_{NFA} = \{ \langle M, w \rangle \mid \text{such that } M \text{ is an NFA that accepts } w \}$. Show that this language is NL-complete.
3. Recall that $E_{DFA} = \{ \langle M \rangle \mid \text{such that } M \text{ is an DFA that accepts no strings} \}$. Show that this language is NL-complete.

Bonus problems

1. Let B be the language of properly nested parentheses and brackets. For example, $([]([])) [[]]$ is in B but $([])$ is not. Show that B is in L .
2. Let $2SAT$ be the language of satisfiable boolean formulas written in conjunctive normal form with 2 variables per clause. (This is the same as $3SAT$ but with smaller clauses. However, unlike with $3SAT$, not all formulas can be reduced to a formula of this form.) Show that $2SAT$ is NL-complete.