Lecture 9 – Closure properties of context-free languages, Dyck languages

NTIN071 Automata and Grammars

Jakub Bulín (KTIML MFF UK)

Spring 2024

* Adapted from the Czech-lecture slides by Marta Vomlelová with gratitude. The translation, some modifications, and all errors are mine.

Recap of Lecture 8

- Pushdown automata accept exactly context-free languages (constructions: CFG to PDA and PDA to CFG)
- A deterministic pushdown automaton (DPDA)
- DPDA recognize a proper subclass of context-free languages, accepts by empty stack iff prefix-free and accepts by final state (Deterministic PDA + acceptance by empty stack does not even cover regular languages!)
- Deterministic PDA have unambiguous grammars
- The landscape of languages
- Converting between representations of context-free languages
- Undecidable problems about context-free languages (preview)

2.12 Closure properties of context-free languages

Not closed under intesection

Substitution and homomorphism

2.13 Dyck languages

Dyck languages

A characterization of context-free languages