Spring 2016

Mathematical Linguistics

http://research.nii.ac.jp/~kanazawa/teaching.html

Instructor

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Course description

This course investigates various types of grammar formalisms that are used for formal description of natural language, with a particular emphasis on the formal properties and efficient parsing algorithms concerning so-called "mildly context-sensitive" grammar formalisms, including tree-adjoining grammars and multiple context-free grammars. Time permitting, we review some work on abstract categorial grammars, a formalism that captures syntax and semantics within a single framework using lambda calculus.

Here is a tentative list of topics to be covered:

(1) Generative capacity and natural language

(2) Pushdown automata and stack-based parsing

(3) Tabular parsing

(4) Tree-adjoining grammars and related formalisms

(5) Context-free tree grammars and indexed grammars

(6) Mildly context-sensitive languages

(7) Tabular parsing of mildly context-sensitive grammars

(8) Montague semantics and generation; abstract categorial[1] grammars

Prerequisites

Elementary knowledge of regular and context-free languages.

[1]This is not a typo! The adjective "categorial", not to be confused with "categorical", is a technical term used to refer to a certain class of grammar formalisms.

Texts

There is no textbook for this course. Lecture notes will be made available. A good background reading is

Michael Sipser. 2012. *Introduction to the Theory of Computation, Third Edition.* Boston, Mass.: Cengage Learning.

Grading

The course grades will be based on homework assignments and a term paper reviewing an article of your choice from the list of suggested further readings, to be supplied later.