LING 6798-0002 / LING 3795 – Mathematical Structures in Linguistics

Spring semester 2018

Instructor

Jos Tellings, jos.tellings@uconn.edu
Office hours: Wednesdays 2pm – 3.30pm (my office is OAK 355)
or by appointment (don't hesitate to e-mail me)

Outline

This course has two objectives: to get experience in reading formal texts in linguistics, and to learn about some important mathematical concepts used in syntax and semantics. No mathematical background is required, and we will start with an introduction to basic mathematical tools. The course is open to both undergraduate and graduate students.

Time and place

Wednesdays & Fridays, 12n – 1:30pm
OAK 338

Readings

We will use lecture notes, and also look at some papers to get training in reading formal texts. The following textbook is recommended to be used in combination with the course:

[MSL] Keenan, E. L., & Moss, L. S. (2016). *Mathematical Structures in Language.* Stanford: CSLI Publications

Course requirements

- There are 6 problem sets to practice the mathematical formalisms. These are due on Wednesdays (see schedule).
- Participation.

Undergraduate students:	You are expected to do all the readings, and participate in class discussions.
Graduate students:	In addition to the above, you should lead discussion of two of the papers we are reading.

- You can do a take-home exam, or write a term paper on applying some mathematical formalism to a linguistic problem. If you opt for the term paper option, you should talk to me by March 28 to get your topic approved.

Course website

We will use HuskyCT. I will post updates and readings on the course website, so please check regularly.

Schedule

Date	Topics covered	Readings	PS
Wed, Jan 17 Fri, Jan 19	MATH INTRO: set theory, functions, cardinality, recursive definitions		
Wed, Jan 24 Fri, Jan 26	MATH INTRO: orderings, trees	Kayne (1994: chs. 1+2)	
Wed, Jan 31 Fri, Feb 2	MATH INTRO: reading and writing proofs		PS1 due
Wed, Feb 7 Fri, Feb 9	SYNTAX: categorial grammar	Lambek (1958)	
Wed, Feb 14 Fri, Feb 16	SYNTAX: formal grammars, regular languages, context-free languages	Clark (2014)	PS2 due
Wed, Feb 21 Fri, Feb 23	SYNTAX: automata, transducers, Chomsky hierarchy	Jäger and Rogers (2012)	
Wed, Feb 28 Fri, Mar 2	SYNTAX: formalization of Minimalist grammars; complexity of natural language	Stabler (1997)	PS3 due
Wed, Mar 7 Fri, Mar 9	SYNTAX: further formal issues about Minimalism (features, constraints)	Graf (2017)	
Mar 14 / Mar 16	Spring recess, no class		
Wed, Mar 21 Fri, Mar 23	SEMANTICS: models, interpretations, logic		
Wed, Mar 28 Fri, Mar 30	SEMANTICS: lattice structures, Boolean semantics	MSL, Chapter 9	PS4 due
Wed, Apr 4 Fri, Apr 6	SEMANTICS: use of lattices in semantic theory	Link (1983)	
Wed, Apr 11 Fri, Apr 13	SEMANTICS: quantifier scope issues (QR vs. in-situ approaches)	Keenan (2016)	PS5 due
Wed, Apr 18 Fri, Apr 20	SEMANTICS: classes of generalized quantifiers	Keenan (2002)	
Wed, Apr 25 Fri, Apr 27	SEMANTICS: inquisitive semantics	Roelofsen (2013)	PS6 due

References

Clark, A. (2014). *An introduction to multiple context free grammars for linguists*. Ms.

Graf, T. (2017). A computational guide to the dichotomy of features and constraints. *Glossa*, *2*(1), 18:1–36.

Jäger, G., & Rogers, J. (2012). Formal language theory: refining the Chomsky hierarchy. *Philosophical Transactions of the Royal Society B*, *367*, 1956–1970.

Kayne, R. (1994). *The Antisymmetry of Syntax*. MIT Press.

Keenan, E. L. (2002). Some properties of natural language quantifiers: generalized quantifier theory. *Linguistics and Philosophy*, *25*, 627–654.

Keenan, E. L. (2016). *In Situ* Interpretation without Type Mismatches. *Journal of Semantics*, *33*(1), 87–106.

Keenan, E. L., & Moss, L. S. (2016). *Mathematical Structures in Language*. Stanford: CSLI Publications.

Lambek, J. (1958). The mathematics of sentence structure. *American Mathematical Monthly*, *65*, 154–170.

Link, G. (1983). The Logical Analysis of Plural and Mass Terms. In R. Bäuerle, C. Schwarze, & A. von Stechow (eds.), *Meaning, Use and Interpretation of Language*, pp. 302–323.

Roelofsen, F. (2013). Algebraic foundations for the semantic treatment of inquisitive content. *Synthese*, *65*, 79–102.

Stabler, E. P. (1997). Derivational minimalism. In C. Retoré (ed.), *Logical Aspects of Computational Linguistics*, pp. 68–95. Springer.