
LIN 386M
Mathematical and Computational Linguistics
Spring 2002, Par 308, W4-7
Unique No. 37040

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Requirements: vigorous participation in class discussion, regular class presentations, and a detailed literature survey on a topic of your interest.

Topics:

Statistical Approaches : Charniak (1993), Abney (1996)

Regular Expressions : Kaplan and Kay (1994), Karttunen et al. (1997)

Finite State Transducers : Mohri (1996), Mohri (1997), Roche and Schabes (1997),
Beesley and Karttunen (2002)
<http://www.xrce.xerox.com/research/mltt/fst/fsrefs.html>

CFGs : Perrault (1984), Postal and Langendoen (1984), Pullum and Gazdar (1982),
Higginbotham (1984), Pullum (1984), Berwick (1984), Pullum (1985), Culy (1985),
Shieber (1985), Kac (1987), Manaster-Ramer (1987a)

MCSGs : Joshi (1985), Abeillé and Rambow (2000), Frank (2002)

NL Parsing : Dowty et al. (1985), Reyle and Rohrer (1988), Mohri and Nederhof (2001)

Complexity of NL : Savitch et al. (1987), Miller (1991), Ristad (1993), Frank and Satta (1998), Karttunen (1998)

Text: There is no textbook. Readings will be assigned depending upon the topic under discussion. Some of the relevant readings are listed below.

Useful Collections: Dowty et al. (1985), Savitch et al. (1987), Manaster-Ramer (1987b), Reyle and Rohrer (1988), Sells et al. (1991), Partee et al. (1993), Klavans and Resnik (1996), Roche and Schabes (1997), Papers by Lauri Karttunen on Finite State Systems at: <http://www.parc.xerox.com/istl/members/karttune/>

References

- Abeillé, A., and O. Rambow, eds. (2000) *Tree Adjoining Grammars*, CSLI.
- Abney, S. (1996) “Statistical Methods and Linguistics,” in J. L. Klavans and P. Resnik, eds., *The Balancing Act*, MIT Press, Cambridge, MA, 1–26.
- Beesley, K. R., and L. Karttunen (2002) *Finite-State Morphology: Xerox Tools And Techniques*, Cambridge University Press, Cambridge, England.
- Berwick, R. C. (1984) “Strong Generative Capacity, Weak Generative Capacity, and Modern Linguistic Theories,” *Computational Linguistics* 10:3-4, 189–202.
- Charniak, E. (1993) *Statistical Language Learning*, MIT Press, Cambridge, MA.
- Culy, C. (1985) “The Complexity of the Vocabulary of Bambara,” *Linguistics and Philosophy* 8:3, 345–351.
- Dowty, D., L. Karttunen, and A. Zwicky, eds. (1985) *Natural Language Processing—Theoretical, Computational and Psychological Perspectives*, Cambridge University Press, New York.
- Frank, R. (2002) *Phrase Structure Composition and Syntactic Dependencies*, MIT Press, Cambridge, MA.
- Frank, R., and G. Satta (1998) “Optimality Theory and the Generative Complexity of Constraint Violability,” *Computational Linguistics* 24:2, 307–315.
- Higginbotham, J. (1984) “English is Not a Context-Free Language,” *Linguistic Inquiry* 15:2, 225–234.
- Joshi, A. K. (1985) “How Much Context-Sensitivity is Necessary for Characterizing Structural Descriptions—Tree Adjoining Grammars,” in D. Dowty, L. Karttunen, and A. Zwicky, eds., *Natural Language Processing—Theoretical, Computational and Psychological Perspectives*, Cambridge University Press, New York.
- Kac, M. B. (1987) “Surface Transitivity, Respectively Coordination and Context-Freeness,” *Natural Language and Linguistic Theory* 5:3, 441–452.
- Kaplan, R. M., and M. Kay (1994) “Regular Models of Phonological Rule Systems,” *Computational Linguistics* 20:3, 331–378.
- Karttunen, L. (1998) “The Proper Treatment of Optimality in Computational Phonology,” in *Proceedings of International Workshop on Finite-State Methods in Natural Language Processing*, Bilkent University, Ankara, Turkey, 1–12.
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- Miller, P. H. (1991) "Scandinavian Extraction Phenomena Revisited: Weak and Strong Generative Capacity," *Linguistics and Philosophy* 14:1, 101–113.
- Mohri, M. (1996) "On some applications of Finite State Automata Theory to Natural Language Processing," *Natural Language Engineering* 2:1, 1–20.
- Mohri, M. (1997) "Finite-State Transducers in Language and Speech Processing," *Natural Language Engineering* 23:2, 269–312.
- Mohri, M., and M.-J. Nederhof (2001) "Regular Approximation of Context-Free Grammars through Transformation," chapter 9 in J.-C. Junqua and G. van Noord, eds., *Robustness in Language and Speech Technology*, Kluwer Academic Publishers, The Netherlands, 153–163.
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- Postal, P. M., and D. T. Langendoen (1984) "English and the Class of Context-Free Languages," *Computational Linguistics* 10:3-4, 177–181.
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