Семинар по формальным языкам
Обзор обасти

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Способы формализации

- Грамматики Хомского
- Булевы граммтики
- Языки и группы
- И ещё много разных подходов

Булевы граммтики

- Okhotin A. Conjunctive and Boolean grammars: the true general case of the context-free grammars //Computer Science Review. – 2013. – T. 9. – C. 27-59.
- Okhotin A. Nine Open Problems on Conjunctive and Boolean Grammars //Bulletin of the EATCS. – 2007. – T. 91. – C. 96-119.
- Kuznetsov S., Okhotin A. Conjunctive Categorial Grammars //Proceedings of the 15th Meeting on the Mathematics of Language. – 2017. – C. 140-151.

Языки и группы

- Anisimov A. V. Group languages //Cybernetics and Systems Analysis. – 1971. – Т. 7. – №. 4. – С. 594-601.

- Muller D. E., Schupp P. E. Groups, the theory of ends, and context-free languages //Journal of Computer and System Sciences. – 1983. – Т. 26. – №. 3. – С. 295-310.

- Salvati S. MIX is a 2-MCFL and the word problem in $\mathbb{Z}^2$ is solved by a third-order collapsible pushdown automaton //Journal of Computer and System Sciences. – 2015. – Т. 81. – №. 7. – С. 1252-1277.

- Nederhof M. J. A short proof that O_2 is an MCFL //arXiv preprint arXiv:1603.03610. – 2016.

- Ho M. C. et al. The word problem of $\mathbb{Z}^n$ is a multiple context-free language //arXiv preprint arXiv:1702.02926. – 2017.

- Nesin R., Asli G. Descriptions of Groups using Formal Language Theory : дис. – Department of Computer Science, 2016.

Другие подходы

- Comon H. et al. Tree automata techniques and applications. Available on: h ttp //tata. gforge. inria. fr. release 12th October. – 2007.
- Rayward-Smith V. J. Hypergrammars: an extension of macrogrammars //Journal of Computer and System Sciences. – 1977. – Т. 14. – №. 1. – С. 130-149.
- Fischer M. J. Grammars with macro-like productions //Switching and Automata Theory, 1968., IEEE Conference Record of 9th Annual Symposium on. – IEEE, 1968. – С. 131-142.
- Schabes Y. Mathematical and computational aspects of lexicalized grammars. – 1990.
- Joshi A. K., Schabes Y. Tree-adjoining grammars //Handbook of formal languages. – 1997. – Т. 3. – С. 69-124.

Пересечение языков/грамматик

- Динамически формируемый код
- Графовые базы данных
- Статический анализ кода
- Верификация
- Поиск в сжатом тексте
- ...

- Verbitskaia E., Grigorev S., Avdyukhin D. Relaxed parsing of regular approximations of string-embedded languages //International Andrei Ershov Memorial Conference on Perspectives of System Informatics. – Springer International Publishing, 2015. – C. 291-302.
- Azimov R., Grigorev S. Graph Parsing by Matrix Multiplication //arXiv preprint arXiv:1707.01007. – 2017.
- Hellings J. Querying for Paths in Graphs using Context-Free Path Queries //arXiv preprint arXiv:1502.02242. – 2015.
- Bastani O., Anand S., Aiken A. Specification inference using context-free language reachability //ACM SIGPLAN Notices. – ACM, 2015. – T. 50. – №. 1. – C. 553-566.

- Nederhof M. J., Satta G. Parsing non-recursive context-free grammars //Proceedings of the 40th Annual Meeting on Association for Computational Linguistics. – Association for Computational Linguistics, 2002. – C. 112-119.

- Nederhof M. J., Satta G. The language intersection problem for non-recursive context-free grammars //Information and Computation. – 2004. – T. 192. – №. 2. – C. 172-184.

- Zhang Q., Su Z. Context-sensitive data-dependence analysis via linear conjunctive language reachability //Proceedings of the 44th ACM SIGPLAN Symposium on Principles of Programming Languages. – ACM, 2017. – C. 344-358.

- Clark A. Canonical context-free grammars and strong learning: two approaches //The 14th Meeting on the Mathematics of Language. – 2015. – C. 99.
- Clark A. Computational Learning of Syntax //Annual Review of Linguistics. – 2017. – T. 3. – C. 107-123.
- Burghardt J. E-Generalization Using Grammars //arXiv preprint arXiv:1403.8118. – 2014.
- Clark A., Yoshinaka R. Distributional learning of context-free and multiple context-free grammars //Topics in Grammatical Inference. – Springer Berlin Heidelberg, 2016. – C. 143-172.

Что ещё?

- Fulop S. A., Kephart D. Topology of Language Classes //The 14th Meeting on the Mathematics of Language. – 2015. – C. 26.
- Cai L., Malmberg R. L., Wu Y. Stochastic modeling of RNA pseudoknotted structures: a grammatical approach //Bioinformatics. – 2003. – T. 19. – №. suppl_1. – C. i66-i73.
- Zier-Vogel R., Domaratzki M. RNA pseudoknot prediction through stochastic conjunctive grammars //Computability in Europe 2013. Informal Proceedings. – 2013. – C. 80-89.