One-Sided Random Context Grammars

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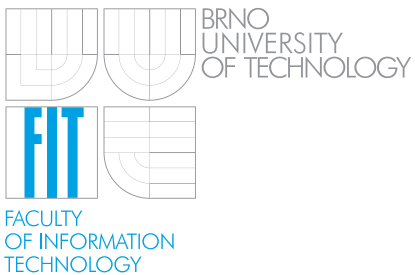

Ph.D. Thesis Defense, 2014-09-12

Introduction

Area

- theoretical computer science
- formal language theory
- regulated rewriting

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Topic

- one-sided random context grammars
- a new regulated formal model
- a variant/generalization of existing formal models

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- one-sided random context grammars
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- a variant/generalization of existing formal models

Focus

- thorough theoretical treatment
- placement into the context of the current formal language theory

Random Context Grammars

- a modification of context-free grammars
- $(A \to x, U, W) \in P$

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Illustration

$(A \to x, \{B, C\}, \{D\}) \in P$

$bBcECbAcB$

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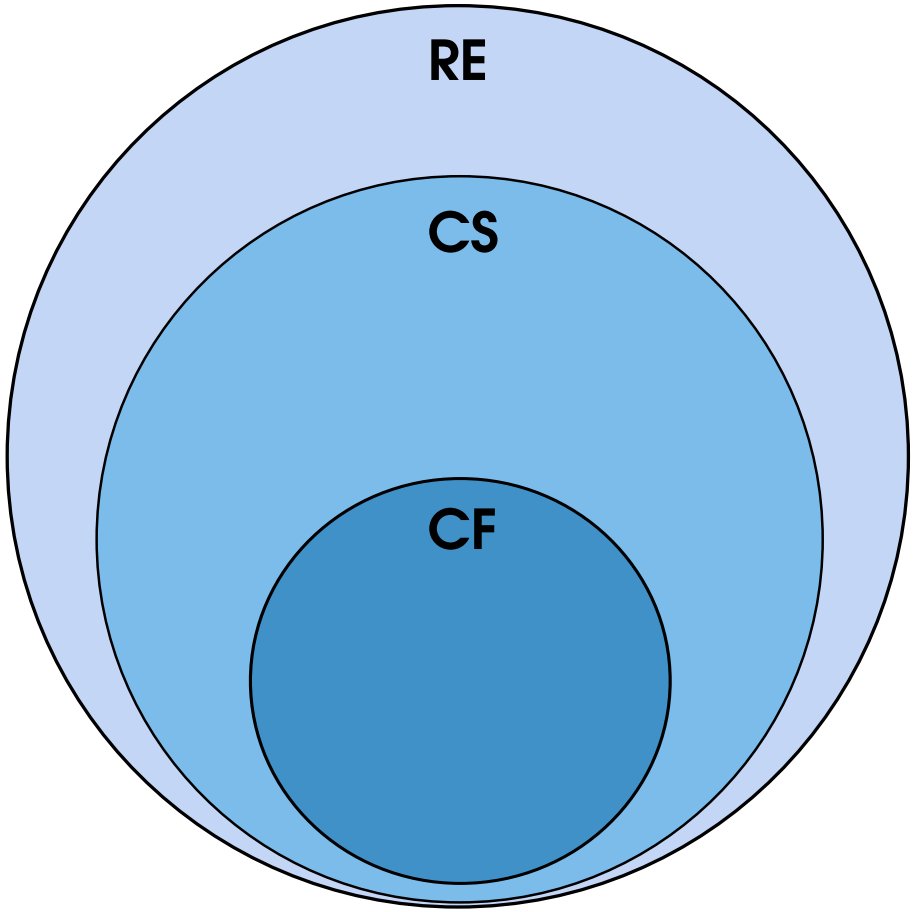
Generative Power



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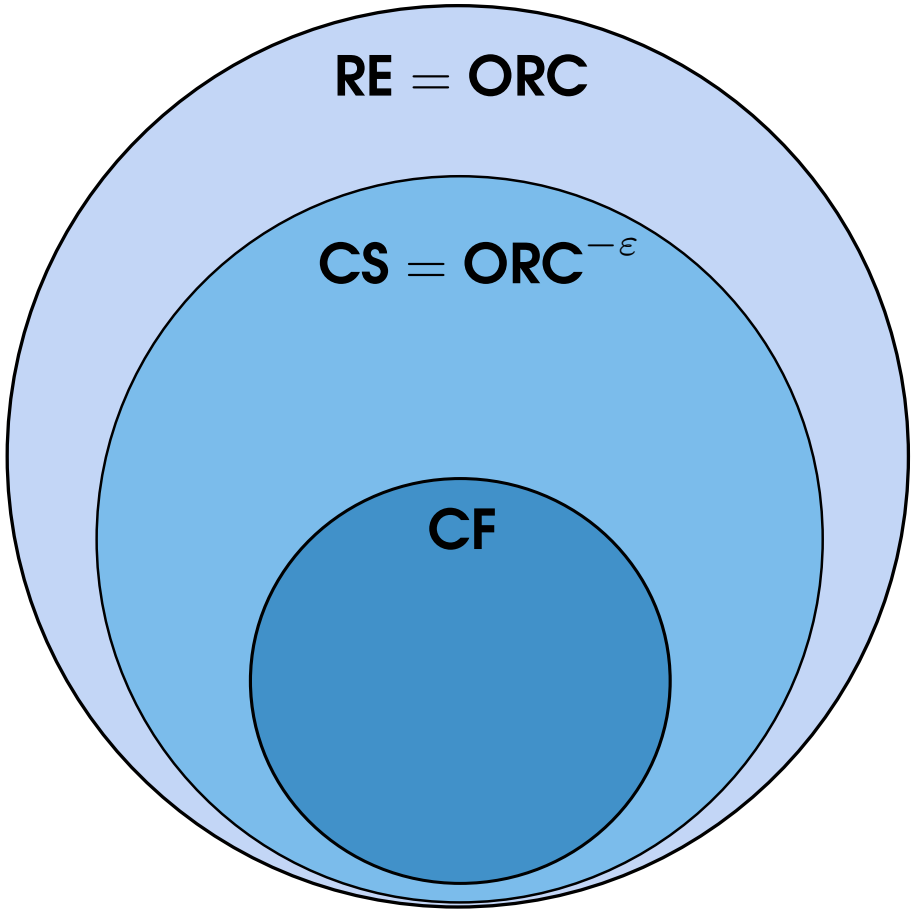

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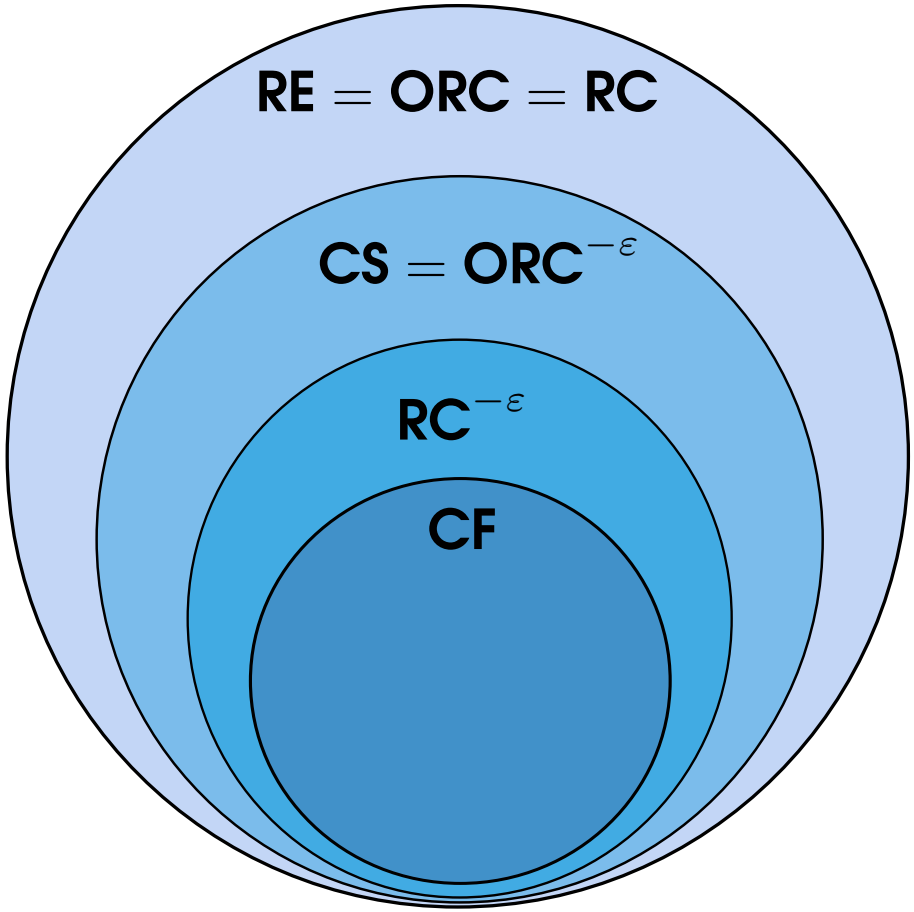

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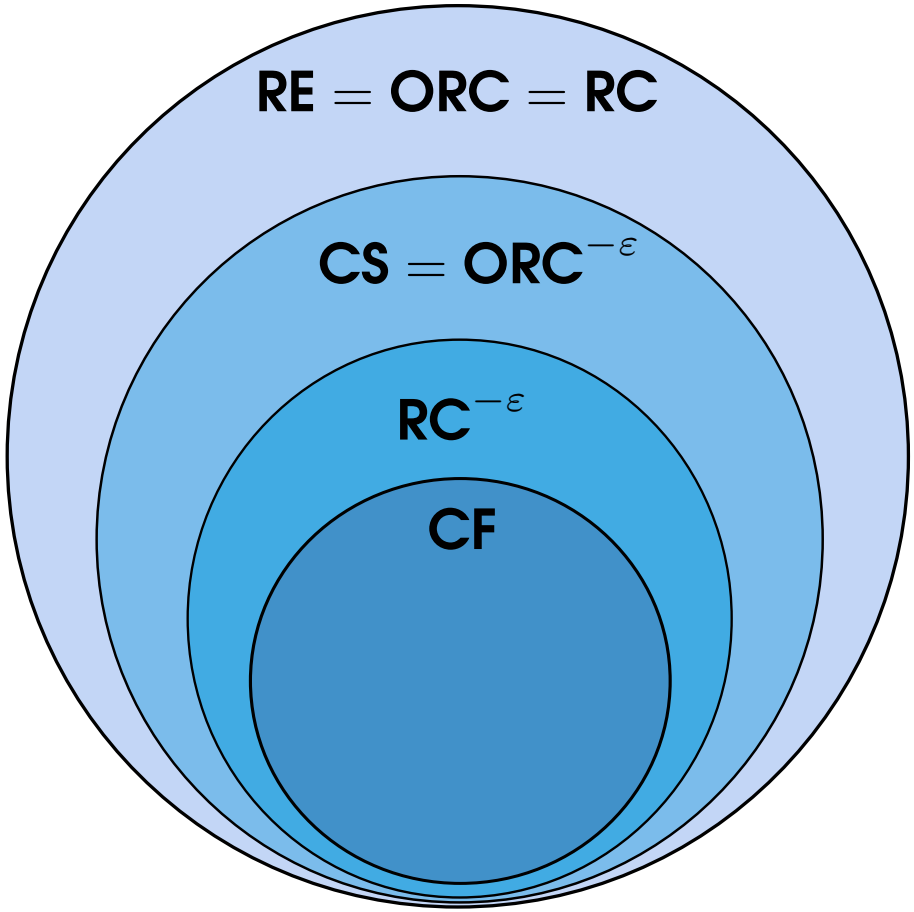

A. Meduna and P. Zemek
One-Sided Random Context Grammars
In: *Acta Informatica*, 2011

A. Meduna and P. Zemek
One-Sided Forbidding Grammars and Selective Substitution Grammars
In: *International Journal of Computer Mathematics*, 2012

Descriptional Complexity

- reduction of nonterminals

A. Meduna and P. Zemek

Nonterminal Complexity of One-Sided Random Context Grammars

In: *Acta Informatica*, 2012

Theorem

Every one-sided random context grammar can be converted to an equivalent one having no more than 10 *nonterminals.*

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- reduction of right random context rules

A. Meduna and P. Zemek

One-Sided Random Context Grammars with a Limited Number of R.R.C. Rules

In: *Theoretical Computer Science*, 2014

Theorem

Every one-sided random context grammar can be converted to an equivalent one having no more than 2 *right random context rules.*

Other Investigated Topics

- normal forms

P. Zemek

Normal Forms of One-Sided Random Context Grammars
In: *Proceedings of Student EEICT*, 2012

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- leftmost derivations

  

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  One-Sided Random Context Grammars with Leftmost Derivations
  In: *LNCS Festschrift Series: Languages Alive*, 2012

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- parsing-related versions

  A. Meduna and L. Vrábel and P. Zemek

  LL One-Sided Random Context Grammars

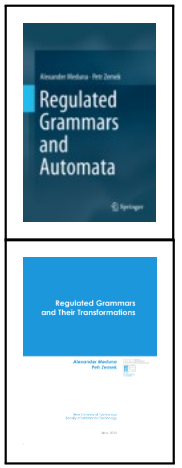
  In: *Egyptian Informatics Journal* (submitted)

Summary and Contribution

- theoretical treatment of a new regulated formal model
- generalization of left permitting/forbidding grammars
- survey of current knowledge
- open problems and future research possibilities
- possible use in solving some well-known open problems
- application perspectives
- key results published in distinguished journals

All Publications (2010–2014)

- 2 books
  - A. Meduna and P. Zemek
    Regulated Grammars and Automata
    Springer, New York, US, 694 pages, 2014
  - A. Meduna and P. Zemek
    Regulated Grammars and Their Transformations
    BUT FIT, Brno, CZ, 239 pages, 2010



- 1 book chapter
- 13 international journal papers (12 with IF)
- 10 international conference papers
- 3 international conference posters/presentations
- 3 student competition contributions

\+ 4 currently submitted manuscripts