Constructive Formalization of Regular Languages

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Contents

Motivation

- Interest in formalizations growing stronger
- No complete and elegant formalization of regular languages in Coq
- Recent formalizations avoid FA in favor of partial derivatives

Previous work

- Constructively formalizing automata theory (2000)
  Robert L. Constable, Paul B. Jackson, Pavel Naumov, Juan C. Uribe
  PA: Nuprl
  The first constructive formalization of MH.
  Based on **FA**.

- Proof Pearl: Regular Expression Equivalence and Relation Algebra
  Alexander Krauss, Tobias Nipkow
  PA: Isabelle
  Based on **partial derivatives of RE**.

- Deciding Kleene Algebras in Coq (2011)

Thomas Braibant, Damien Pous

PA: Coq

Based on **FA**, matrices. Focus on performance.

- A Decision Procedure for Regular Expression Equivalence in Type Theory (2011)

  Thierry Coquand, Vincent Siles

  PA: Coq

  Based on **partial derivatives of RE**.

- A Formalisation of the Myhill-Nerode Theorem based on Regular Expressions (Proof Pearl) (2011)

  Chunhan Wu, Xingyuan Zhang, Christian Urban

  PA: Isabelle
  The first proof of MH based on **partial derivatives of RE**.