Le Havre, le 10 mars 2002

UNIVERSITE DU HAVRE
Laboratoire d'Informatique du Havre
ANNONCE DE SEMINAIRE

Cher(e)s collègues,

Vous êtes invité(e)s à assister au séminaire de Djelloul Ziadi, Maître de conférences, à l'Université de Rouen (Faculté des Sciences). Le thème du séminaire est le suivant :

Calcul de l'automate des équations d'une expression rationnelle en espace et temps quadratiques

Date : Mardi 19 mars 2002
Lieu : Amphi LESIEUR (FST)
Horaire : 16h

Résumé : Two classical constructions to convert a regular expression into a finite non-deterministic automaton provide complementary advantages: the notion of position of a symbol in an expression, introduced by Glushkov and McNaugthon-Yamada, leads to an efficient computation of the positions automaton (there exist quadratic space and time implementations w.r.t. the size of the expression), whereas the notion of derivative of an expression w.r.t. a word, due to Brzozowski, and generalized by Antimirov, yields a small automaton. The number of states of this automaton, called the equations automaton, is less than or equal to the number of states of the positions automaton, and in practice it is generally much smaller.
So far, algorithms to build the equations automaton, such as Mirkin's or Antimirov's ones, have a high space and time complexity. We shall present a quadratic space and time algorithm to compute the equations automaton, improving by a cubic factor Antimirov's construction. This algorithm is based on the computation of a new kind of derivative, called canonical derivative, which allows one to connect the notion of continuation in a linear expresion due to Berry and Sethi, and the notion of partial derivative of a regular expression due to Antimirov. The main interest of the notion of canonical derivative is that it makes it possible to efficiently compute the equations automaton as a specific reduction of the positions automaton.

Bibliographie :

- V. Antimirov. Partial derivatives of regular expressions and finite automato constructions. *Theoret. Comput. Sci.*, 155:291–319, 1996.
- A. Brüggemann-Klein, Regular Expressions into Finite Automata. *Theoret. Comput. Sci.*, 120(1993), 197–213.
- A. Brzozowski. Derivatives of regular expressions. *J. Assoc. Comput. Mach.*, 11(4):481–494, 1964.
- J.-L. Ponty, D. Ziadi and J.-M. Champarnaud, A new Quadratic Algorithm to convert a Regular Expression into an automaton, In: D. Raymond and D. Wood, eds., *WIA'96*, *Lecture Notes in Computer Science*, 1260(1997) 109–119.

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