Abstract

Regularity of Linear Parsing Expression Grammars

Nariyoshi Chida[1,a)] Kimio Kuramitsu[1,b)]

Presented: October 27, 2016

PEGs are formalized by Ford in 2004, and have several pragmatic operators (such as ordered choice and unlimited lookahead) for better expressing modern programming language syntax. Since these operators are not explicitly defined in the classic formal language theory, it is significant and still challenging to argue PEG's expressiveness in contexts of the formal language theory. Since PEGs are relatively new, there are several unsolved problems. One of the problems is that revealing a subclass of PEGs that is equivalent to DFAs. This allows to apply some techniques from the theory of regular grammar to PEGs. In this presentation, we define Linear PEGs, a subclass of PEGs that is equivalent to DFAs. Surprisingly, LPEGs are formalized by only excluding some patterns of recursive nonterminal in PEGs, and include the full set of ordered choice, unlimited lookahead, and greedy repetition, which are characterized for PEGs. Although the conversion judgement of parsing expressions into DFAs is undecidable in general, the formalism of LPEGs allow a syntactical judgement of parsing expressions.

[1] Graduate School of Electronic and Computer Engineering, Yokohama National University, Yokohama, Kanagawa 240–8501, Japan
[a)] chida-nariyoshi-pg@ynu.jp
[b)] kimio@ynu.ac.jp