ABSTRACT

Reasoning about data types in general and about lists and arrays in specific is an important research area with many applications, such as formal program verification. Early work on this focused on proving inductive properties.

In this presentation, we investigate the unification problem modulo various combinations of theories of lists. We first examine lists with right cons (rcons) and reverse (rev) as observer theories. We show that unification modulo this combination is NP-complete and present an algorithm for unification modulo this combined theory which runs in exponential time. We then combine these two theories with the theory of length and show how this combination may be decided without increasing the asymptotic run-time. We also discuss how the theory of rcons alone may be used to capture the behavior of a queue. We then consider the unification problem modulo the theory of fold right or reduce. We then investigate this theory in combination with rev and with length.