

Transformational Verification of Quicksort (Invited Talk)

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Many transformation techniques developed for constraint logic programs, also known as *constrained Horn clauses* (CHCs), have found new useful applications in the field of program verification. In this paper, we work out a nontrivial case study through the transformation-based verification approach. We consider the familiar *Quicksort* program for sorting lists, written in a functional programming language, and we verify the pre/postconditions that specify the intended correctness properties of the functions defined in the program. We verify these properties by: (1) translating them into CHCs, (2) transforming the CHCs by removing all list occurrences, and (3) checking the satisfiability of the transformed CHCs by using the Eldarica solver over booleans and integers. The transformation mentioned at Point (2) requires an extension of the algorithms for the elimination of inductively defined data structures presented in previous work, because during one stage of the transformation we use as lemmas some properties that have been proved at previous stages.