

# Refinement Type Checking via Assertion Checking

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**Abstract.** A refinement type can be used to express a detailed specification of a higher-order functional program. Given a refinement type as a specification of a program, we can verify that the program satisfies the specification by checking that the program has the refinement type. Refinement type checking/inference has been extensively studied and a number of refinement type checkers have been implemented. Most of the existing refinement type checkers, however, need type annotations, which is a heavy burden on users. To overcome this problem, we reduce a refinement type checking problem to an assertion checking problem, which asks whether the assertions in a program never fail; and then we use an existing assertion checker to solve it. This reduction is sound and complete, and enables us to construct a fully automated refinement type checker by using a state-of-the-art fully automated assertion checker. We also report on preliminary experiments. A paper about this work will be published in Journal of Information Processing.