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AUTOMATIC DETECTION OF INCORRECT RULES IN EQUIVALENT TRANSFORMATION PROGRAMS

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Abstract. *A method of detecting bugs automatically in equivalent transformation (ET) programs is proposed. For this purpose, theories for finding "contradictions" within given ET programs are constructed. By applying the proposed method, a part of a program which includes incorrectness is detected. Moreover the proposed method does not use oracles.*
Keywords: Equivalent transformation model, Algorithmic debugging, Program correctness

1. **Introduction.** In many cases, bugs in programs are detected by programmers themselves manually. In this detection, they trace computational states and judge correctness of each computational state one by one. If the computational state can be traced and the correctness can be judged automatically, then we can develop automatic debugging algorithms. The automatic debugging means the detection of bugs by using debugging algorithms, which run when a program and informations about correctness of the program are given, and return a buggy part (see Figure 1). However doing the judgement auto-

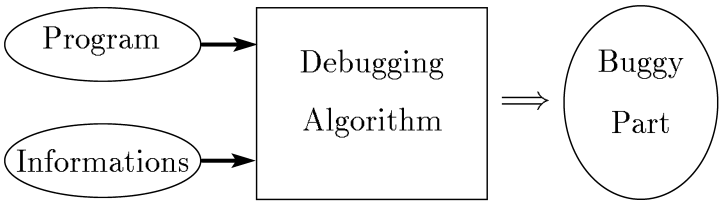

Figure 1. Automatic debugging

matically is impossible in most programming languages, since correctness of each state is not known before completion of programs. Therefore automatic debugging is a difficult task in most programming languages.

In this paper, we discuss automatic debugging of equivalent transformation (ET) programs, which are the programs in the ET computation model proposed by Akama et al. [1,