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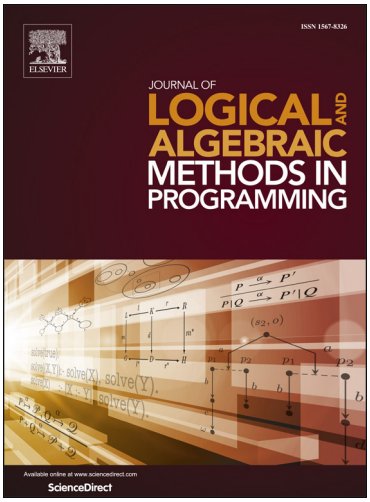

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Algorithmic Debugging Generalized[☆]

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Abstract

Algorithmic debugging is a semi-automatic debugging technique that abstracts the operational details of computations, allowing the programmers to debug their code from an abstract point of view. However, its use in practice is still marginal, and one of the reasons is the lack of precision of this technique when reporting errors (current algorithmic debuggers do not point an expression or line as buggy, but they point a whole procedure/function/method as containing the bug). In this paper, we make a step forward to overcome this problem. We identify two specific causes of that problem in the standard formulation and implementations of algorithmic debugging, and we present a reformulation to solve both problems. We show that the novel ideas included in the reformulation proposed cannot be supported by the standard internal data structures (such as the Execution Tree) used in this technique and, hence, a generalisation of the standard definitions and algorithms is needed. The reformulation has been done in a language-independent manner to make it useful and reusable in different programming languages.

Keywords: Algorithmic Debugging, Transformation, Generalization

> *"Everything is vague to a degree you do not realize till you have tried to make it precise"*. Bertrand Russell

1. Introduction

Algorithmic Debugging (AD) [28, 6] is a semi-automatic debugging technique with a high level of abstraction. It is composed of two independent phases: error diagnosis and error correction. This technique has experienced a significant advance in the last decade. Concretely, new techniques have been proposed to improve performance [9, 15], to improve scalability [11],

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