

Wodel-Test: a model-based framework for language-independent mutation testing

Pablo Gómez-Abajo¹, Esther Guerra¹, Juan de Lara¹ y Mercedes G. Merayo²

¹{pablo.gomez, esther.guerra, juan.delara}@uam.es

Universidad Autónoma de Madrid

²mgmerayo@fdi.ucm.es

Universidad Complutense de Madrid

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Resumen(Abstract). Mutation testing (MT) targets the assessment of test cases by measuring their efficiency to detect faults. This technique involves modifying the program under test to emulate programming faults and assessing whether the existing test cases detect such mutations. MT has been extensively studied since the 70's, and many tools have been proposed for widely used languages like C, Java, Fortran, Ada and SQL; and for notations like Petri-nets. However, building MT tools is costly and error-prone, which may prevent their development for new programming and domain-specific (modelling) languages.

In this paper, we propose a framework called Wodel-Test to reduce the effort to create MT tools. For this purpose, it follows a model-driven approach by which MT tools are synthesized from a high-level description. This description makes use of the domain-specific language Wodel to define and execute model mutations. Wodel is language-independent, as it allows the creation of mutation operators for any language defined by a meta-model. Starting from the definition of the mutation operators, Wodel-Test generates a MT environment which parses the program under test into a model, applies the mutation operators, and evaluates the test-suite against the generated mutants, offering a rich collection of MT metrics. We report on an evaluation of the approach based on the creation of MT tools for Java and the Atlas transformation language.