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Test-driven verification/validation of model transformations

Key words: Graph rewriting based model transformations, Verification/validation of model transformations, Test-driven verification

Corresponding author: László Lengyel

E-mail: lengyel@aut.bme.hu

 ORCID: <http://orcid.org/0000-0002-5129-4198>

Motivation

- Improve the quality of the transformations, and therefore the quality of the generated software artifacts.
- Verified/validated model transformations make it possible to ensure certain properties of the generated software artifacts.
- Verification/validation methods can guarantee different requirements stated by the actual domain against the generated/modified/optimized software products.

Main results

- Emphasize the necessity of methods that make model transformation verified/validated.
- Discuss the different scenarios of model transformation verification and validation.
- Introduce the principles of a novel test-driven method for verifying/validating model transformations.

Main results (Con'd)

- Provide a solution that makes it possible to automatically generate test input models for model transformations.
- Collect and discuss the actual open issues in the field of verification/validation of model transformations.

Classification of model transformation approaches

Different types of model transformation approaches

Traversal-based and direct manipulation approaches

Graph rewriting based approaches

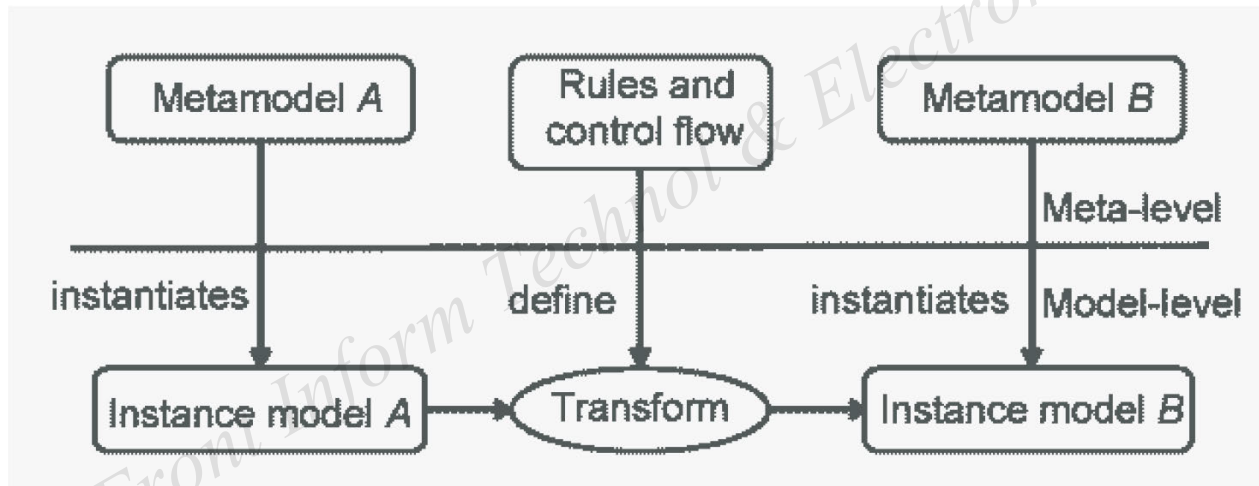
Template-based approaches

Structure-driven approaches

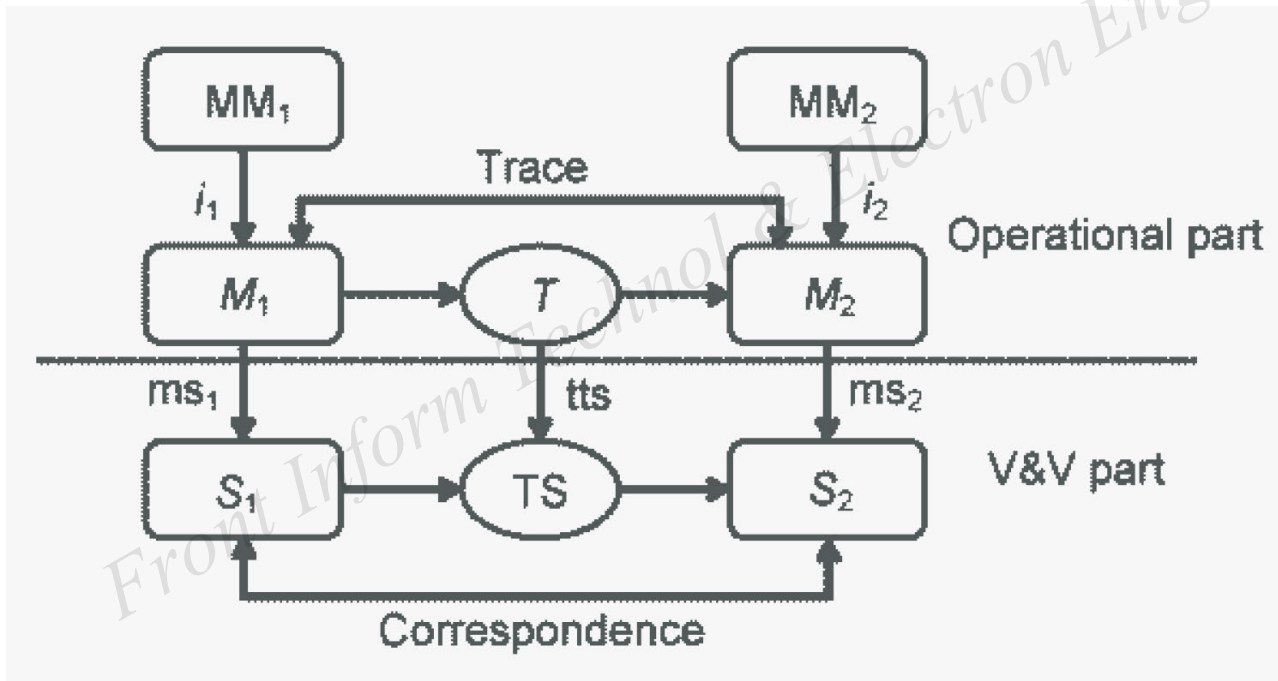
Relational approaches

Hybrid approaches

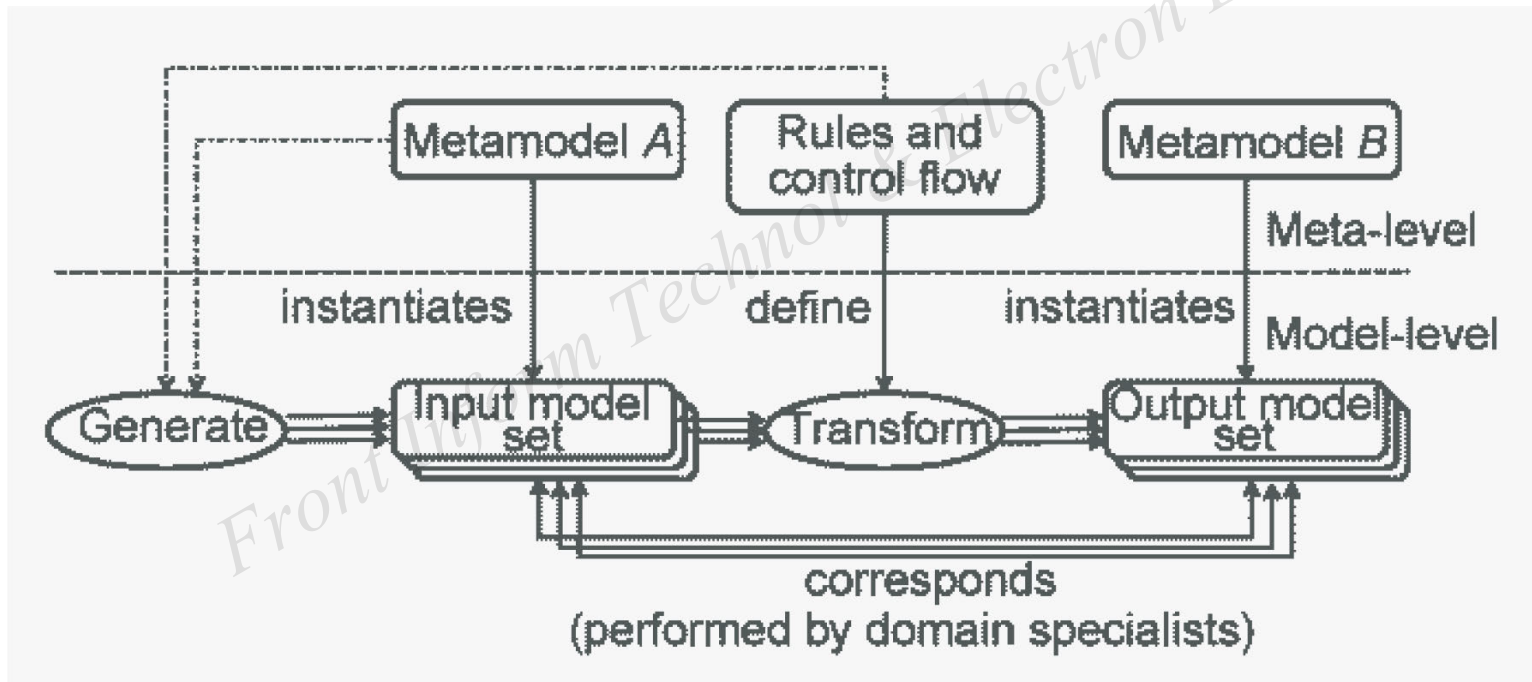
Model transformation process



The paths of model transformations



Architecture of the test-driven validation approach



Summary

- Discussed the different scenarios of model transformation verification and validation.
- Provided a dynamic validation method, and introduced the key motivation and challenging points of the test-driven validation approach.
- Provided the basic and advanced versions of our solution, which make it possible to automatically generate test input models for model transformations.
- Compiled the actual open issues in the field of verification/validation of model transformations.