Spectrum-Based Fault Localization in Model Transformations

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Resumen(Abstract). Model transformations play a cornerstone role in Model-Driven Engineering (MDE), as they provide the essential mechanisms for manipulating and transforming models. The correctness of software built using MDE techniques greatly relies on the correctness of model transformations. However, it is challenging and error prone to debug them, and the situation gets more critical as the size and complexity of model transformations grow, where manual debugging is no longer possible.

Spectrum-Based Fault Localization (SBFL) uses the results of test cases and their corresponding code coverage information to estimate the likelihood of each program component (e.g., statements) of being faulty. In this article we present an approach to apply SBFL for locating the faulty rules in model transformations.

We evaluate the feasibility and accuracy of the approach by comparing the effectiveness of 18 different state-of-the-art SBFL techniques at locating faults in model transformations. Evaluation results revealed that the best techniques, namely *Kulcynski2*, *Mountford*, *Ochiai*, and *Zoltar*, lead the debugger to inspect a maximum of three rules to locate the bug in around 74% of the cases. Furthermore, we compare our approach with a static approach for fault localization in model transformations, observing a clear superiority of the proposed SBFL-based method.