Metrics for Analyzing the Quality of Model Transformations — Extended Abstract

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Model Driven Engineering [2] is an emerging software engineering discipline in which models play a central role throughout the entire development process. MDE combines domain-specific modeling languages for modeling software systems and model transformations for synthesizing them. Similar to other software engineering artifacts, model transformations have to be used by several developers, have to be changed according to changing requirements and should preferably be reused. Because of the prominent role of model transformations in today’s and future software engineering, there is the need to define and assess their quality. Quality attributes such as modifiability, understandability and reusability need to be understood and defined in the context of MDE, i.e., for model transformations. The goal of our research is to make the quality of model transformations measurable. Currently, we focus on model transformations created using the ASF+SDF [3] term rewriting system, but we expect that our techniques can be applied to model transformations created using different transformation engines such as ATL [4] as well.

We identified seven quality attributes relevant for model transformations, viz. understandability, modifiability, reusability, modularity, conciseness, consistency, and completeness. Most of these quality attributes have already be defined for other software artifacts. We describe why they are specifically relevant for model transformations. We also identified a set of approximately forty metrics and related these to the quality attributes to define how the quality attributes should be assessed. Furthermore, we created a tool that can extract (most of) the metrics we defined from model transformations specified in the ASF+SDF formalism. We used this tool to evaluate a number of transformations. The same transformations were also manually evaluated by ASF+SDF experts to validate the relationship between metrics and quality attributes we established.

The next step in our ongoing research is to define a set of metrics for ATL and use these to assess the same quality attributes. We also plan to define a quality model in which we define a relationship between the quality attributes. Once we have identified quality problems in model transformations, we can propose a methodology for improving their quality.

⋆ This is an extended abstract of [1]
References