

**AUTOMATIC COMPONENT-BASED SYNTHESIS OF USER-CONFIGURED
MANUFACTURING SIMULATION MODELS**

Alexander Mages
Carina Mieth

Jens Hetzler

TRUMPF Werkzeugmaschinen SE & Co. KG
Johann-Maus-Straße 2
Ditzingen, 71254, GERMANY

ITK Engineering GmbH
Im Speyerer Tal 6
Rülzheim, 76761, GERMANY

Fadil Kallat
Jakob Rehof
Christian Riest
Tristan Schäfer

Department of Computer Science
Chair for Software Engineering
TU Dortmund University
Otto-Hahn-Straße 12
Dortmund, 44227, GERMANY

ABSTRACT

Using simulation models for manufacturing facilities is a common approach for planning, optimizing, and testing different machine configurations and positioning before the actual construction. However, creating these models is time-consuming and costly. Consequently, only a few different simulation models are usually created based on best practices and experience, precluding any examination of the entire variety of possible solutions. To address these obstacles, we present a proof of concept to automate and hence reduce the cost of the process of simulation model creation, thereby allowing for the creation of a larger number of selectable solution variants. Based on a given master simulation model, which obtained all possible variations of a shop floor, we defined simulation building blocks as components. We used component-based synthesis using combinatory logic to synthesize a product line of varying simulation models for a given configuration to be executed and evaluated to find suitable solutions.