

Using Static Parametric Design to Support Systems Engineering of Industrial Automation Systems

Hongchao Ji¹ Lars Mikelsons¹ Karl Kempf¹ Dieter Schramm²

¹Bosch Rexroth AG, Lohr am Main, Germany

{hongchao.ji, lars.mikelsons, karl.kempf}@boschrexroth.de

²University of Duisburg-Essen, Duisburg, Germany

dieter.schramm@uni-due.de

This paper proposes a static parametric design methodology for application of the model based systems engineering (MBSE) paradigm in the world of Modelica. This methodology allows for parameter synthesis of the industrial automation systems under consideration of customer requirements. Furthermore, the parametrized system can be verified automatically. An integrated system model consisting of requirements, system design and verification models is created and can be used as a design template to generate a new parameter set according to the change of customer requirements. A case study from the practice is presented to proof the concept of this methodology.

The objective of the static parametric design methodology is to perform a parameter synthesis of a technical system according to the customer requirements automatically. The following diagram illustrates the main idea of this methodology. The starting point is a formalized requirements model which defines the requirement variables and performance variables. According to the selection variables calculated from the static calculation model, the proper components of the desired system can be selected iteratively from the product catalog. The optimal design can be verified by the means of simulation automatically.

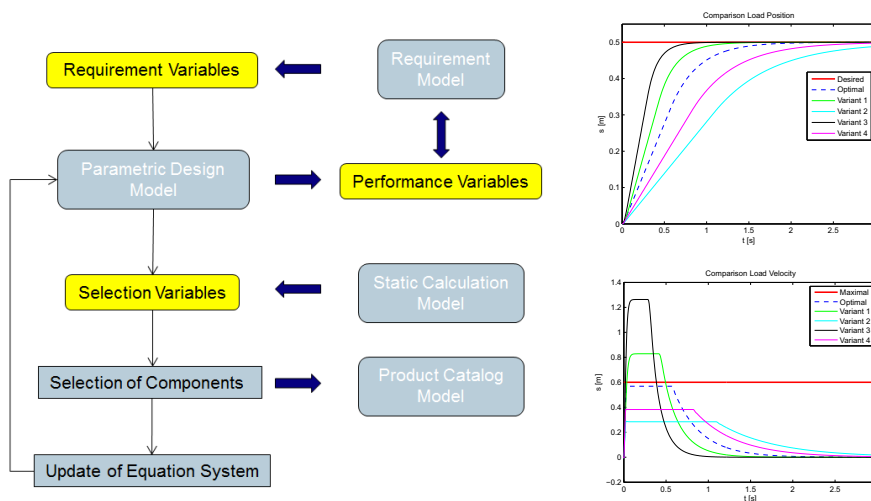


Figure 1: Static Parametric Design Methodology