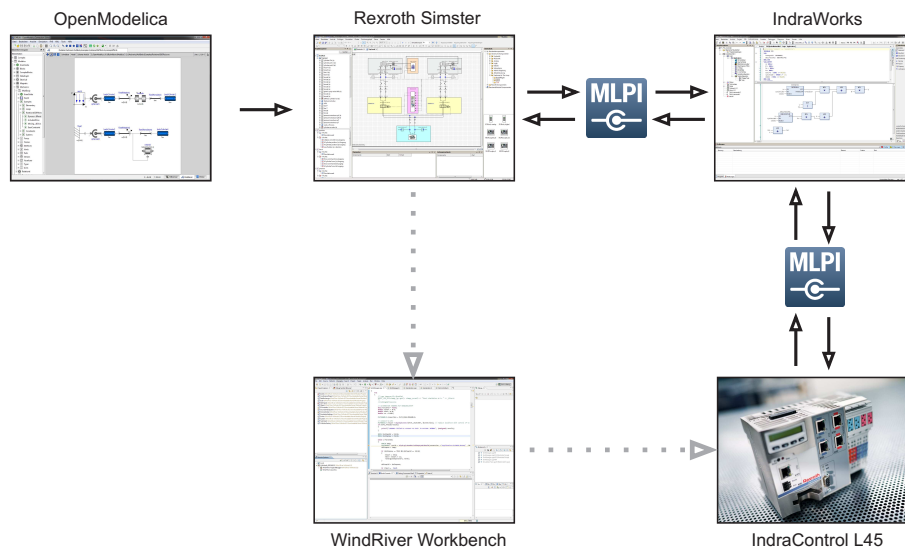


A toolchain for Rapid Control Prototyping using Rexroth controllers and open source software

Nils Menager Niklas Worschech Lars Mikelsons
Bosch Rexroth AG
Rexrothstr. 3, 97816 Lohr a. Main

Taking a look at project costs from a financial point of view, the commissioning times of new industrial systems become more and more important, as they significantly drive the costs. Hence, the reduction of commissioning times is part of current research. Besides the use of simulation and the coupling between hardware and software (Hardware-In-The-Loop-Simulations), *Rapid Control Prototyping* offers a huge potential to reduce commissioning times. There are already possibilities to use virtually designed control algorithms on real-time operating systems using Hardware-In-The-Loop-Setups. Two possibilities are using a dSPACE system or a xPC system in combination with *Matlab/Simulink*. Though, using such a toolchain leads to three serious drawbacks.

First, these commercial systems are very expensive. Second, even in that case the control algorithm has to be re-implemented on the real control hardware after testing on the real-time system. Furthermore, it has to be taken into account that the usage of such commercial real-time systems leads to dependencies to external software (e.g. *Matlab/Simulink*).



The aim of this work is to set up a toolchain for Rapid Control Prototyping with a Rexroth controller (IndraControl L45) using open source software and Modelica for the modeling part, i.e. a toolchain, which is completely independent from external software and hardware. To be more precise, this toolchain enables the engineer to transfer virtual controller models modeled in Modelica directly to standard Rexroth controllers. To validate the functionality, in this contribution, the controller is used in a Hardware-In-The-Loop setup. The validation of the controller in combination with a real system is part of current work.