The New EDrives Library: A Modular Tool for Engineering of Electric Drives

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Abstract

Simulation is an indispensable tool for the engineering of systems containing electric drives. Depending on the design phase and the engineering task different levels of modeling details are required: proof of concept, investigation of energy and power consumption, design of control, etc. The new EDrives library provides three levels of abstraction for inverters: quasi static (neglecting electrical transients), averaging (neglecting switching effects) and switching – for serving different demands. The inverters can feed the machine models of the Modelica Standard Library: Modelica.Magnetic.FundamentalWave and the new Modelica.Magnetic.QuasiStatic.FundamentalWave. The EDrives library copes with arbitrary phase numbers and can be easily extended to develop new control algorithms. In this publication the structure of the library and the implemented control principles are presented. Furthermore, examples comparing the three different levels of abstraction are included.