

Modellbildung und Regelung einer dreiphasigen geschalteten Reluktanzmaschine

Fabian Sablotny - Köln, November 2019

Abstract

This master thesis was carried out during an occupation at the [adcos GmbH](#). The initial situation was a switched reluctance machine, which is combined with an adapted version of the company's own control unit with integrated power electronics to form a prototypical drive system. The focus of this thesis is on the one hand the setup of a simulation model of the machine and inverter in the software environment of MATLAB/Simulink and on the other hand the modelbased development of an appropriate motor torque controller and commutation. In addition, a practical identification method is derived, which is based solely on the measurement of the torque characteristics depending on stator winding current and rotor position. Subsequently, a cascaded control structure is developed, which consists of an outer loop for speed control and an inner loop for motor torque control. During motor torque control special lookup tables are used, which reduce the characteristic torque ripple of a switched reluctance machine in a novel way. The fundamental current controller is based on pulse width modulation and avoids the variable switching frequencies of classically applied current-tolerance band controllers. The work concludes with the successful verification of the plant model and the control concept on the test bench.