

Abstract

The design of complex mechatronic systems is predominantly shown by examples from the automotive engineering. The center of attention is the controller development of an electrohydraulic Steer-by-Wire-System (SbW-System). Based on the investigation of a conventional steering system both its static and dynamic characteristics will be transferred to the SbW-System.

To handle the rising complexity of such systems a structuring method is presented. The first step of this approach, the Top-Down-Design, divides the complex structure into subsystems according its functions. Secondly, these attained subsystems are laid out gradually in the Bottom-Up-Design.

Examples will be provided with the overwhelming new concerns of the model synthesis, the analysis of the model and also the controller synthesis. A specific method is developed for the identification of mechatronic system models. This method enables the identification of the physical models higher order, furthermore the identification of multi-input/output-systems and single-input/output-systems is possible. The procedure supports the structured design both in Bottom-Up-Design and in Top-Down-Design.

This distributed structured proceeding for the design of the SbW-System leads to new controller structures and enables the improvement of the static and dynamic characteristics of the steering system.