



# Object-oriented Modeling and Efficient Simulation of C<sup>3</sup>-Systems

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Shaker Verlag Feb 2014, 2014. Buch. Book Condition: Neu. Neuware - Modern technical systems which use various Computation and Communication technologies to accomplish a given Control task are referred to as C<sup>3</sup>-Systems. Among various analysis methods towards those systems, simulation-based approaches are featured by their capability to combine the continuous and discrete dynamics (hybrid dynamics). This work aims at laying a modeling and simulation framework for simulation-based analysis of C<sup>3</sup>-Systems. Based on the object-oriented modeling language Modelica and its tool Dymola, a Network-Controller-Library (NCLib) is developed. An object-oriented analysis and design (OOAD) approach is applied in the development of the library. According to the OOAD approach, the modeling of interactive complex discrete event systems is carried out on the basis of UML graphical representations and unambiguous conversion rules which correspond to the execution semantics of Modelica. Using UML diagrams as conceptual models improves the readability and extendibility of the resulting models. Additionally, a particular focus is laid on improving the simulation efficiency for C<sup>3</sup>-Systems. Therefore, several design patterns for building event-minimized models and a separated simulation scheme are proposed. 178 pp. Englisch.



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