Hierarchical Control of Discrete Event Systems with Flexible Marking

Prof. Dr. José Eduardo Ribeiro Cury

Depto de Automação e Sistemas Universidade
Federal de Santa Catarina Florianópolis, SC, Brasil

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Cauerstraße 7, Hörsaal R4.15

Diskussionsleitung: Dr.-Ing. K. Schmidt

This talk concerns the hierarchical control problem of Discrete Event Systems (DES). After a short introduction to the Supervisory Control Theory, the Hierarchical Control problem is considered. The approach presents a two-level hierarchical supervisory control scheme for a DES, where the low-level is represented in the standard Ramadge-Wonham (RW) framework, and the high-level is represented by a DES with Flexible Marking (DESFM). A DESFM is modeled by a language and a control structure. The language contains all the strings of events that the system can generate. The control structure is a function that associates a set of controls to each string generated by the system. Each control encapsulates information of event-enabling and marking for the string. The DESFM model is shown to be suitable for systems with abstraction as the one used in the high level of the hierarchical structure here presented. The flexibility in the definition of marking provided by a DESFM simplifies the modeling of the high-level marking behavior, making possible to disregard usual structural conditions related to the consistency of the marked behavior, like the marking consistency. As a consequence, a potential advantage of this approach, when compared with other approaches, is the reduction in the number of events and states to model the high-level while guaranteeing hierarchical consistency.ns (e.g. elevated temperature or high power handling) will sum up the talk.