Hybrid Modelling in System Simulation

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Abstract. In times of increasing power and capacity in computer simulation mathematical models are getting more and more important. For different technical applications and in natural science but also in economic systems and management processes appropriate mathematical model descriptions are necessary.
Hybrid modelling is a special technique for more complex model descriptions in order to reduce the degree of complexity. In different fields of interest the behavior of a model is dependent on the active state. When the model description is changing from one state to another a so-called state event takes place. State event modelling is the overall term to describe this modelling approach. One state is defined by one dynamic system description and another state is described by the next description. The mathematical environment of the model allows finding the description which is the best matching one in each state. In this sense it is possible to find the most efficient model description for each state and it is not necessary to build up a complicated model structure to cover all cases in one model.
Beside the principle effect of the basic structure it is also possible to combine different mathematical modelling techniques for realizing a hybrid model for a certain complex system. In each case a certain mathematical model of the mathematical method can be provided. This is the formal mathematical definition of a multi method approach. In different states different models are simulated and a certain master algorithm is managing the overall administration of the discrimination.
The mentioned issues are covered under the overall term hybrid modelling and will be introduced in the corresponding paper.

Keywords: Mathematical Modelling, Hybrid Modelling, System Simulation