Multilinear Hybrid Differential Algebraic Models -Challenges & Applications

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Many engineering applications deal with systems which can be modeled adequately by nonlinear DAEs with mixed-integer variable spaces. For this generic case, no structured representation - like the parameter matrices for continuous-variable linear DAEs - are possible. This changes, if the occuring functions are restricted to be multilinear, where the parameters can be represented as tensors. That opens the door to efficient simulation, analysis, and model reduction methods by tensor decomposition algorithms. Multilinear Hybrid Differential Algebraic Models and efficient computation methods will be introduced in the presentation. Their usefulness for control and diagnosis problems will be discussed for HVAC systems as well as power networks.

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