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Einladung zum Vortrag

von Herrn Sebastian Trip (University of Groningen) zum Thema

Cyber-physical aspects of future power networks

am Donnerstag, 18.01.2018, um 14:00 Uhr, in Raum (IM) SR 040

Abstract

In recent years various solutions have been suggested by the control community to regulate the frequency in power networks and simultaneously reduce generation costs. A particular focus is on distributed control schemes, where controllers communicate with each other over a communication network.

In this talk I will highlight some contributions I made during my research on the study of the closed loop stability of the power network and distributed (optimization / consensus) algorithms. Key insights includes the incremental passivity property of the nonlinear power network and that minimization of generation costs can be achieved by employing a consensus algorithm. To relax communication requirements, I propose a broadcasting implementation of the consensus algorithm, where information is send (broadcasted) at discrete time instances. The stability of the obtained cyber-physical system is analyzed using Lyapunov arguments and an invariance principle for hybrid systems. It is worth to point out that the considered storage function consists of two parts that can be naturally associated to the physical part and the cyber part of the controlled network. Interestingly, the stability analysis prescribes the maximum amount of time that is allowed between two broadcasting instances, such that stability of the power network is guaranteed.