



*Technische Universität Berlin*

Fakultät IV Elektrotechnik und Informatik  
Fachgebiet Regelungssysteme  
Leitung: Prof. Dr.-Ing. Jörg Raisch



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## **Vortragsankündigung**

Seminar Regelungssysteme LV 0430L 654

Monday, July 16th, 2018, 2pm  
Vortragsort: EN 223

**Dr. Kuize Zhang,  
KTH Stockholm**

### **Invertibility of Boolean control networks with applications to some biological systems**

Invertibility is an interesting and classical control-theoretic problem, which implies that the input sequence of a control system can be determined by the output sequence. We adopted the theory of symbolic dynamics to characterize it for Boolean control networks (BCNs). First, it was shown that a BCN generates a continuous mapping from the space of infinite input sequences to the space of infinite output sequences. Based on it, the concept of invertibility of BCNs was defined by the bijectivity of the mapping. Second, using the theory of symbolic dynamics, an equivalent test criterion for invertibility was given; and then an algorithm to construct the inverse BCN for an invertible BCN based on the semi-tensor product of matrices was designed. Third, as an application of invertibility to systems biology, it was proved that the BCN model proposed by Fauré et al. (2006) is not invertible, i.e., arbitrarily controlling mammalian cell cycles is unfeasible, at the theoretical level.