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BOOK OF ABSTRACTS

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Multivalued chaos

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Unlike for single-valued maps, there are many possibilities to define a deterministic chaos for multivalued maps (whence the title). On the other hand, although e.g. the standard Li-Yorke theorem cannot be applied to scalar differential equations or inclusions, in the nonuniqueness case, the associated Poincare operators possess a chaotic behaviour, provided a nontrivial cycle (e.g. of period two) occurs. Phenomena like this will be clarified in detail and a suitability of appropriate definitions of multivalued chaos and hyperchaos will be discussed.

MPC based switching control method for PWL systems

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Mostly, control methods developed for nonlinear systems are used to control hybrid systems. These control methods are based on Mixed Integer Linear Programing (MILP) techniques which have computational complexity. In this study, a new Model Predictive Control (MPC) based switching control technique for Piecewise Linear systems (PWL) -a sub-class of hybrid systems- is developed to get rid of disadvantage of existing control methods.
Keywords: Hybrid systems, Piecewise Linear Systems, MPC.

Kinetics Complexity in Physical Ageing of Chalcogenide Glassy Semiconductors

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Long-term kinetics of natural physical ageing lasting from several days to more than twenty years at the ambient temperature is analysed at the example of As10Se90 glass. Non-monotonic character of this kinetics is registered, which reveals subsequent saturation plateaus and steep

regions (growing step-wise kinetics) owing to multiple alignment-shrinkage stages reaped in the in network structure of glass.
Keywords: Glassy Semiconductors, Physical Ageing, Enthalpy, Relaxation, Kinetics.

The development of 2-phase model of population growth

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We present the development of 2-component model for the description of population growth, distinguishing urban and rural people is proposed. As a quantitative characteristic we use the density of population, supposing it to be constant for cities and varying for rural area. The death rate is supposed to be proportional to density, while birth rate is inversely proportional to density.

Enhancing synchrony in chaotic oscillators by dynamic relaying

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An enhancing of synchrony is described here in a chain of identical oscillators mediated by mismatched oscillator(s). A common time lag is created between the identical outer oscillators and the mismatched central oscillator(s) leading to a LS scenario at a lower critical coupling. This time lag played the role of dynamic relaying in the outer oscillators to establish an indirect coupling between them and thereby enhances CS in the outer oscillators. Several example systems are presented to verify the LS scenario causing the enhancing effect both in the presence and in the absence of coupling delay. An enhancing of synchrony was reported earlier in two oscillators by an induced coupling delay when the coupled system switches from a chaotic to a periodic state. In the present instance, the coupled oscillators remain chaotic before and after the coupling. The enhancing effect is found for a negative mismatch too ! where the central oscillator leads the outer ones instead of lagging. The effect is also found true for unidirectional coupling when the central oscillator drives the identical outer oscillators. A consequence of this observation is that a mismatched central oscillator can drive many identical oscillators in a star-like configuration into enhanced synchrony. Further, in a ring of coupled oscillators, the enhancing is seen in oscillators in symmetric positions to a mismatched oscillator. An experimental evidence of the effect is presented using an electronic