



Berlin Center for Studies of Complex Chemical Systems e. V.

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Max-Delbrück-Centrum für Molekulare Medizin, Otto-von-Guericke-Universität
Magdeburg, Physikalisch-Technische Bundesanstalt, Technische Universität
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Seminar

Complex Nonlinear Processes in Chemistry and Biology

Honorary Chairman: **G. Ertl**

Organizers: M. Bär, C. Beta, H. Engel, M. Falcke, M. J. B. Hauser, A.
S. Mikhailov, P. Plath, L. Schimansky-Geier, H. Stark, J. Kurths

Friday, 14th October 2011, 16:00 s.t.

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Robust network clocks: Design of genetic oscillators as a complex combinatorial optimization problem

Abstract

Complex combinatorial optimization can be used to design network systems having desired dynamics and that are robust against structural perturbations. Here genetic networks exhibiting limit-cycle oscillations with prescribed periods and, furthermore, that are robust against the deletion of links and nodes or the application of noise are constructed. Large ensembles of robust genetic clocks with different periods could thus be obtained, and some of their statistical properties have been investigated. Similar methods can be used to design robust network oscillators of various origins.

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