

Complex Dynamics Group Seminar

Morphogenesis of Chaos

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Abstract

Morphogenesis, as it is understood in a wide sense by René Thom, is considered for various types of chaos. That is, those, obtained by period-doubling cascade, Devaney's and Li-Yorke chaos. Moreover, in discussion form we consider inheritance of intermittency, the double-scroll Chua's attractor and quasiperiodical motions as a possible skeleton of a chaotic attractor. To make our introduction of the talk more clear, we have to say that one may consider other various accompanying concepts of chaos such that a structure of the chaotic attractor, its fractal dimension, form of the bifurcation diagram, the spectra of Lyapunov exponents, etc. We make comparison of the main concept of the talk with Turing's morphogenesis and John von Neumann automata, considering that this may be not only formal one, but will give ideas for the chaos development in the morphogenesis of Turing and for self-replicating machines.

To provide rigorous study of the subject, we introduce new definitions such as chaotic sets of functions, the generator and replicator of chaos, and precise description of ingredients for Devaney and Li-Yorke chaos in continuous dynamics. Appropriate simulations which illustrate the morphogenesis phenomenon are provided.

Undergraduate students are also welcome.

Date: Thursday, May 31, 2012

Time: 16:30

Place: M-203 Seminar Room, Department of Mathematics, METU