



# Kolloquium über Angewandte Mathematik

**Donnerstag, den 03. Februar 2011, um 17:15 Uhr, im Hörsaal 5**

**Prof. Dr. Michael Field \***

(University of Houston (USA), Department of Mathematics)

## “The nature of chaos and some models of neural dynamics”

### Zusammenfassung/Abstract

After a general introduction about the nature of chaos in physical systems (what it is and is not), we describe a simple, yet dynamically rich, discrete model motivated by neural dynamics.

This model incorporates both random and deterministic components. On the mathematical side, there are a number of interesting questions about the statistical (ergodic) behavior of this type of system. From the point of view of numerics and modeling, a feature of the system is the capability of simulating very large numbers of interacting "neurons" with relatively few dynamically interacting nodes.

Finally, we show some striking visualizations and representations of the complex dynamics that may occur with this model. These images have a number of interpretations which we explore and suggest the utility of thinking of observable (neural) outputs as statistical averages; just as we regard physical and chemical laws as statistical averages.

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