Programme du 50e : Méthodes computationnelles rigoureuses et topologiques
pour la dynamique en grande dimension
« Atelier sur la dynamique de calcul rigoureuse dans des dimensions infinies »
3 au 6 avril 2019

50th anniversary program : Topological and Rigorous Computational Methods
for High Dimensional Dynamics
"Workshop on Rigorous Computational Dynamics in Infinite Dimensions"
April 3-6, 2019

Rigorous integrator for nonlinear heat equations in the complex plane of time using semigroup theory

Akitoshi Takayasu *

takitoshi@risk.tsukuba.ac.jp

In this talk, we provide a rigorous numerical integrator for complex-valued solutions of nonlinear heat equations. Extending the time variable of nonlinear heat equations into the complex plane, there seem to be no singularity other than the blow-up point, which exists on the real line. Our aim of this study is to understand the dynamics of such a solution with computer assistance. Combining computer-assisted techniques with semigroup theory, we show local existence in time of solutions in a neighborhood of a numerically computed approximate solution.

This is joint work with Jean-Philippe Lessard, and Hisashi Okamoto.

*Faculty of Engineering, Information and Systems, University of Tsukuba, 3B413, Dai-san Area, Tenoudai 1-1-1, Tsukuba science city, Ibaraki, 305-8573, JAPAN