MATEMATISKA INSTITUTIONEN
STOCKHOLMS UNIVERSITET
Avd. Matematik

SJÄLVSTÄNDIGT ARBETE I MATEMATIK

Måndagen den 19 augusti kl. 11.00–12.00 presenterar Thomas Ohlson Timoudas sitt arbete “Creation of strange attractors in the quasi-periodically forced quadratic family” (30 högskolepoäng, avancerad nivå).

Handledare: Kristian Bjerklöv

Plats: Sal 32, hus 5, Kräftriket

Sammanfattning: In this paper we will study the creation of strange non-chaotic attractors, the invariant, attracting graph of a nowhere continuous measurable $\Psi : \mathbb{T} \to [0,1]$, in certain families of quasiperiodically forced quadratic maps

$$\begin{aligned}\Phi_{\alpha,\beta} &: \mathbb{T} \times [0,1] \to \mathbb{T} \times [0,1] \\ &: (\theta, x) \mapsto (\theta + \omega, c_{\alpha,\beta}(\theta) \cdot x(1-x)),\end{aligned}$$

where ω is a Diophantine irrational, and $c_{\alpha,\beta}(\theta) : \mathbb{T} \to \left[\frac{3}{2}, 4\right]$ is a prescribed family of maps. The same model was studied by Bjerklöv for $\beta = 1$, where it was shown to possess a strange non-chaotic attractor for a certain critical value of $\alpha = \alpha_c$. There it was also shown that $\inf_{\theta \in \mathbb{T}} \Psi(\theta) = 0$.
In this paper, we will show that, whenever $0 \le \beta < 1$, the attractor for that same value of $\alpha = \alpha_c$ is the invariant, attracting graph of a continuous measurable $\Psi : \mathbb{T} \to [0,1]$. Moreover, for the value $\alpha = \alpha_c$, we will establish asymptotic bounds on the minimum distance $\delta(\beta)$, as β goes to 1, from the attractor to the repelling set $\mathbb{T} \times \{0,1\}$, more precisely, we show that there are a $\delta > 0$, and constants $0 \le a_1 \le a_2$ such that

$$a_1(1\beta) \le \delta(\beta) \le a_2(1-\beta)$$

whenever $1 - \delta \le \beta \le 1$.

Alla intresserade är välkomna!