



Einladung zum Oberseminar Dynamische Systeme und Kontrolltheorie

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Attractors of Caputo fractional differential equations

Caputo fractional differential equations (FDE) of order $\alpha \in (0, 1)$ in $\mathbb{R}^d$ do not generate a semi-dynamical system in $\mathbb{R}^d$. Sell observed that the Volterra integral equation associated with an autonomous Caputo FDE of order $\alpha \in (0, 1)$ in $\mathbb{R}^d$ generates a semi-group on the space $\mathcal{C}(\mathbb{R}, \mathbb{R}^d)$ of continuous functions $f : \mathbb{R}^+ \rightarrow \mathbb{R}^d$ with the topology uniform convergence on compact subsets. Doan & Kloeden showed that this gives a semi-dynamical system for the Caputo FDE when restricted to initial functions $f(t) \equiv id_{x_0}$ for $x_0 \in \mathbb{R}^d$. Here it is shown that this semi-dynamical system has a global Caputo attractor in $\mathcal{C}$, which is closed, bounded, invariant and attracts constant initial functions, when the vector field function in the Caputo FDE satisfies a dissipativity condition as well as a local Lipschitz condition. The analysis is complicated by the fact that the usual methods of classical calculus do not hold for fractional calculus.

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Zu diesem Vortrag laden wir Sie herzlich ein.

gez. Sergey Dashkovskiy