



Lothar-Collatz-Kolloquium über Angewandte Mathematik

Donnerstag, den 04. Dezember 2025, um 14:30 Uhr, im Hörsaal 6

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Description of finite-time singularities via dynamics at infinity

Zusammenfassung/Abstract:

There are several cases where initial value problems of differential equations cannot be solved at a finite time due to, say divergence or loss of regularity.

In this talk, I shall provide a description of such finite-time singularities for ODEs from the viewpoint of dynamical systems.

In particular, “finite-time blow-up” is mainly focused.

Through embeddings (compactifications) of phase spaces and time-scale transformations, vector fields are transformed into appropriate ones, called desingularized vector fields, which “dynamics at infinity” makes sense.

Local (center-)stable manifolds of invariant sets, in particular “hyperbolicity”, at infinity then describe blow-up solutions with their asymptotic behavior, the blow-up rates and geometric morphology.

Here I'll talk about an overview of results involving this issue as far as the time permits, including various generalizations such as “type-II blow-ups”, “asymptotic expansions” and extension to “nonautonomous systems” etc. .

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