

Winter Term 2021.
Advanced Topics in Analysis and PDE: V5B3
Dynamical Systems.

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In this course the classical theory of Dynamical Systems will be considered. Some of the topics discussed include the Theory of Bifurcation, the dynamics of difference and ordinary differential equations, Renormalization group methods in dynamical systems, periodic solutions, the Lindstedt-Poincaré method, the theory of forced oscillations, chaos and the Melnikov's method to analyze the behaviour near a homoclinic trajectory.

Applications of the theory of Dynamical Systems both to finite dimensional problems as well as Partial Differential Equations will be discussed. If time permits

Prerequisites for this course are a basic knowledge of Real Analysis and the Theory of Ordinary Differential equations.

References

- [1] R. de la Llave, A tutorial on KAM Theory. Preprint.
- [2] P. G. Drazin, Nonlinear Systems, Cambridge University Press.
- [3] P. G. Drazin, Solitons: An Introduction, Cambridge University Press.
- [4] S. H. Strogatz, Nonlinear Dynamics and Chaos. Perseus Books.
- [5] C. E. Wayne, An Introduction to KAM Theory. Preprint.