Winter Term 2018.

Advanced Topics in Analysis and PDE: V5B1

Dynamical Systems.

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In this course the classical theory of Dynamical Systems will be presented. 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.

In the course applications of the theory of Dynamical Systems to finite dimensional problems as well as Partial Differential Equations will be discussed. If there is time, the theory of solitons for the KdV theory using Inverse Scattering Methods will be also discussed.

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

References

[1] P. G. Drazin, Nonlinear Systems, Cambridge University Press.

[2] P. G. Drazin, Solitons: An Introduction, Cambridge University Press.