Ordinary Differential Equations Preliminary Exam Syllabus

Department of Mathematical Sciences

University of Cincinnati

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Linear systems: linear systems with constant coefficients, phase portraits and dynamical classification, linear systems and exponentials of operators, linear systems and canonical forms of operators.

Fundamental theory: existence and uniqueness, continuity and differentiability of solutions in initial conditions, extending solutions, global solutions.

Nonlinear systems: nonlinear sinks and sources, hyperbolicity, stability, limit sets, gradient and Hamiltonian systems, the Poincaré-Bendixson Theorem, bifurcations.

This material is covered in MATH 7005.

Text:
Lawrence Perko, *Differential Equations and Dynamical Systems.*