SYLLABUS
MASTER'S/PHD QUALIFYING EXAM

ORDINARY DIFFERENTIAL EQUATIONS

**Topics:** May 1996

1. Elementary solution techniques (e.g. Math 316).

2. Existence, uniqueness, and continuation of solutions and continuity with respect to parameters.

3. Linear systems with constant and periodic coefficients.

4. Basic ideas of stability theory including the theory of almost linear systems and the theory of Liapunov functions.

5. Two-dimensional system. Phase plane portraits. Energy method; Poincare-Bendixon theory.

6. Regular perturbation theory and 1st order averaging theory.

**References:**


1. V. Arnold, *Ordinary Differential Equations.*"

2. W.E. Boyce and R.C. DiPrima, *Elementary Differential Equations.*"

3. F. Brauer and J. Noel, "*Qualitative Theory of Ordinary Differential Equations.*"

4. E. Coddington and N. Levinson, *Theory of Ordinary Differential Equations.*"

5. J. Hale, "*Ordinary Differential Equations.*"

6. M. Hirsch and S. Smale, "*Differential Equations, Dynamical Systems, and Linear Algebra.*"

7. W. Hurewicz, "*Lectures on Ordinary Differential Equations.*"

8. D. Jordan and P. Smith, "*Nonlinear Ordinary Differential Equations.*"

9. L. Perko, "*Differential Equations and Dynamical Systems.*"

10. F. Verhulst, "*Nonlinear Differential Equations and Dynamical Systems.*"


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