ODE PhD Written Exam Syllabus

November 15, 2004

1. Explicit solution of linear constant coefficient ODEs in closed form and using matrix exponential.


3. Smooth dependence of solutions on parameters (and initial conditions); Gronwall’s inequality.

4. Existence and nonexistence of solutions for all time


6. Phase plane analysis for linear and nonlinear systems

7. Poincare-Bendixson theorem

8. Gradient systems

9. Stable and unstable manifolds

10. Stability of periodic solutions; Floquet theory, Poincare maps.

11. Elementary bifurcation theory; saddle-node and Hopf bifurcation.