



Midterm Exam Outline

Math 104B: Numerical Analysis
Professor: Paul J. Atzberger

- Theory of Ordinary Differential Equations (ODEs)
 - o Lipschitz continuity, convexity
 - o Definition of well-posedness
 - o Sufficient criteria for well-posedness
 - o Uniqueness, existence, robustness to perturbations
- Numerical Approximation of ODEs
 - o Euler's Method
 - truncation error
 - error bound
 - stability
 - o Taylor Methods
 - o Runge-Kutta Methods
 - explicit / implicit methods
 - second order methods
 - fourth order methods
 - o Multistep Methods
 - Adams-Moulton Methods
 - Adams-Bashforth Methods
 - truncation error
- Stability and Stiffness
 - o estimating stiffness of ordinary differential equations
 - o stability analysis for one-step methods
 - o stability analysis for multi-step methods