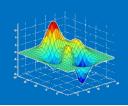
Midterm Exam Outline



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

- Numerical representation and round-off error
 - o signed integers (32-bit).
 - o floating point IEEE 754 standard
 - 32-bit, 64-bit.
 - o k-digit chopping.
 - o k-digit rounding.
- Error Analysis
 - o absolute error, relative error.
 - o number of significant digits.
- Analysis of algorithms
 - o definition of algorithms.
 - o "big oh" and "little oh" notations: O(f(n)), o(g(n).
 - o rates of convergence.
- Equations of one variable
 - o zero finding problems: f(p) = 0
 - existence.
 - uniqueness.
 - bisection method
 - conditions for convergence.
 - rate of convergence.
 - different types of stopping criteria.
 - o fixed-point problems: f(p) = p
 - existence.
 - uniqueness.
 - relations between zero finding problems and fixed-point problems
 - fixed-point iteration
 - conditions for convergence.
 - rate of convergence.
 - stable and unstable fixed points.
 - Newton's Method and Secant Method
 - sufficient conditions for convergence.
 - rate of convergence.
 - general error analysis of methods.
 - o rates of convergence.
- Lagrange polynomial interpolation basics
 - existence and uniqueness for n+1 distinct nodes
 - error bound and analysis
 - evaluation using Neville's method