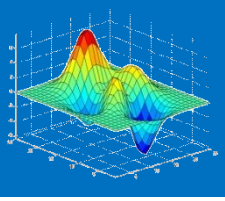

Midterm Exam Outline

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

- Numerical representation and round-off error
  - signed integers (32-bit).
  - floating point IEEE 754 standard
    - 32-bit, 64-bit.
  - k-digit chopping.
  - k-digit rounding.

- Error Analysis
  - absolute error, relative error.
  - number of significant digits.

- Analysis of algorithms
  - definition of algorithms.
  - “big oh” and “little oh” notations: O(f(n)), o(g(n).
  - rates of convergence.

- Equations of one variable
  - zero finding problems: f(p) = 0
    - existence.
    - uniqueness.
  - bisection method
    - conditions for convergence.
    - rate of convergence.
    - different types of stopping criteria.
  - 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.
  - rates of convergence.