In this class:

- The Newton method and how it works where bisection cannot!

- The Secant method and how it avoids needing the derivatives that Newton’s requires.

- The fixed-point form of the nonlinear equation problem.

- List of topics

- Selected problems from HW
Background I assume

Linear algebra
Calculus
Differential equations
Discrete math
Programming
Probability

I’ll try to remind you what you need to know
Topics we’ve covered

**Week 10**
- Intro to Applied Math
- Function representations
- Polynomial interpolation
- Lagrange polynomials
- Barycentric form
- Vandermonde matrix
- Piecewise polynomials
- ApproxFun

**Week 11**
- Numerical differentiation
  - Truncation error for numerical differentiation
  - Errors in forward difference
  - Errors in central difference
- Combinations of floating point error and truncation error
- Richardson extrapolation
- Errors in polynomial interpolation
- High dimensional polynomials

**Week 12**
- Numerical integration
  - Quadrature
  - Trapezoidal rule
  - Composite trapezoidal rules

**Week 13**
- Ordinary differential equations
  - Forward Euler
  - Local truncation error
  - Consistency
  - Convergence
  - Stability
  - Absolute stability
  - Backwards Euler
  - Runge-Kutta

**Week 14**
- Nonlinear equations
  - Bisection
  - Newton’s method
  - Secant method
  - Fixed Point methods