General information for MATH 228A

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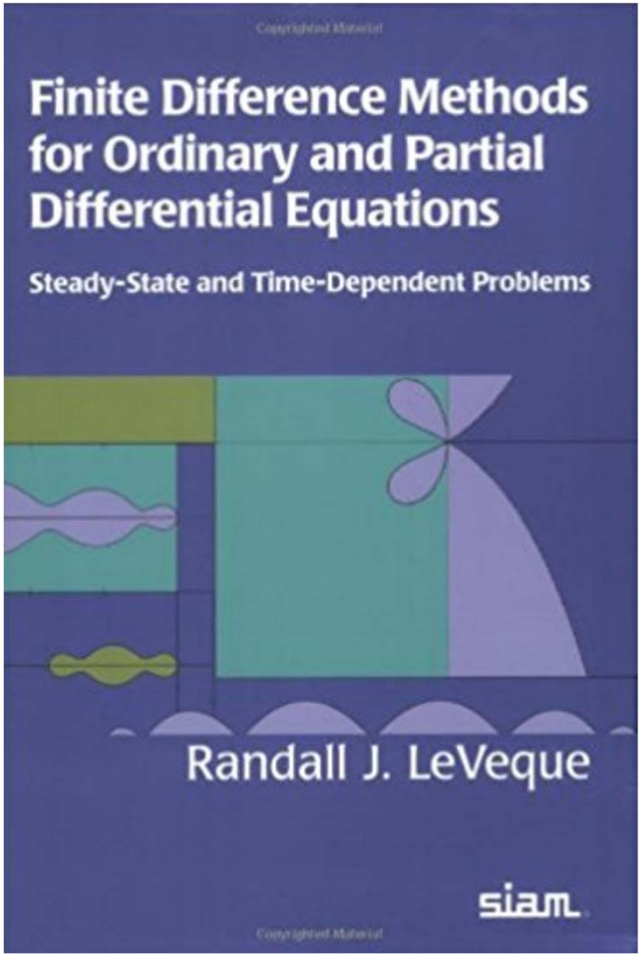
Office Hours: **W 3PM-4PM**

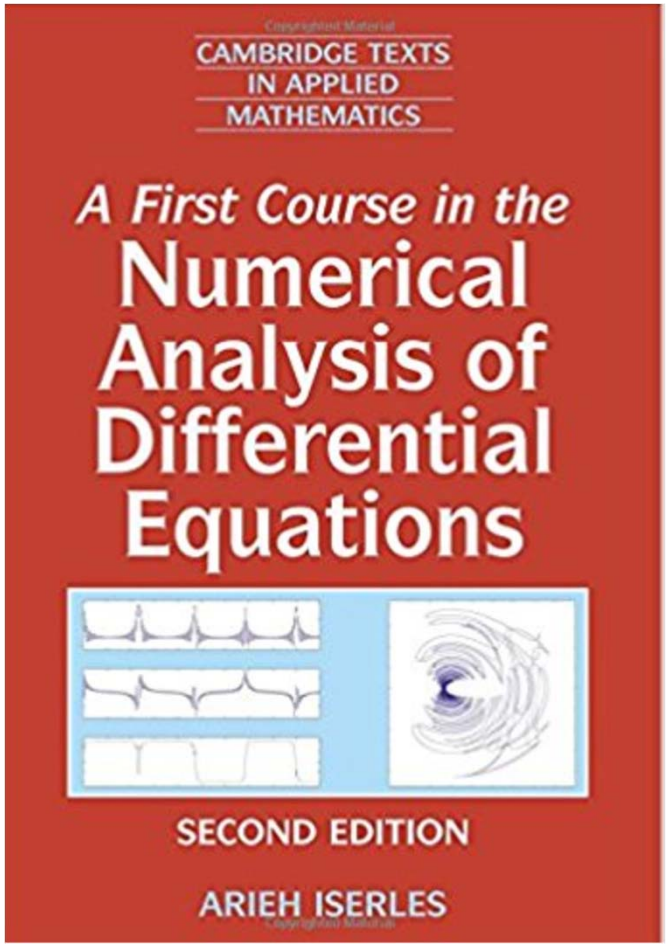
Caution:

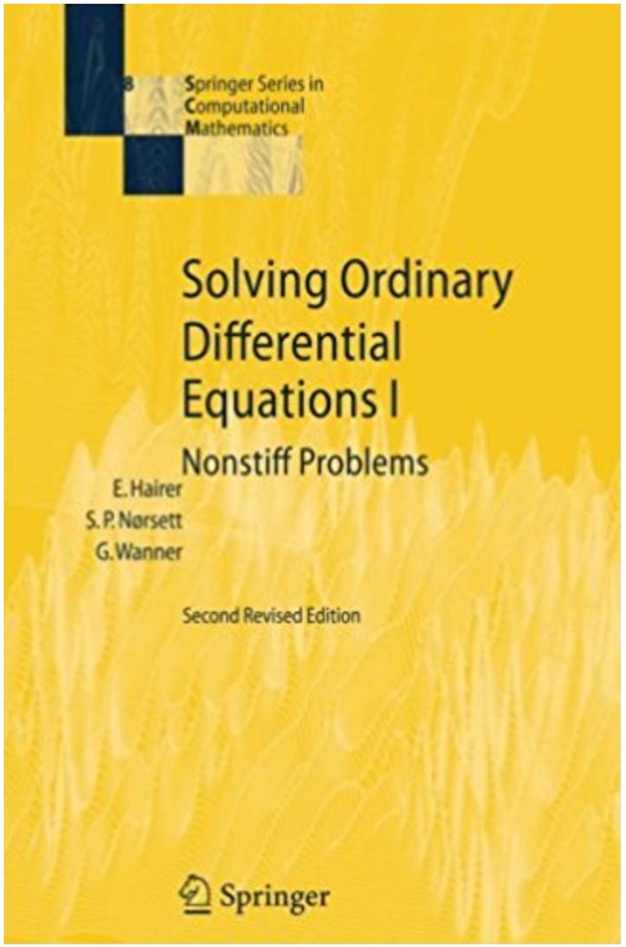
This class involves

PROOF & Coding

& NOT many real world examples


Finite Difference Methods for Ordinary and Partial Differential Equations
Steady-State and Time-Dependent Problems
Randall J. LeVeque
siam


CAMBRIDGE TEXTS IN APPLIED MATHEMATICS
A First Course in the
Numerical Analysis of Differential Equations
SECOND EDITION
ARIEH ISERLES


Springer Series in Computational Mathematics
Solving Ordinary Differential Equations I
Nonstiff Problems
E. Hairer
S. P. Nørsett
G. Wanner
Second Revised Edition
Springer

Scientific computing languages

Compiled language

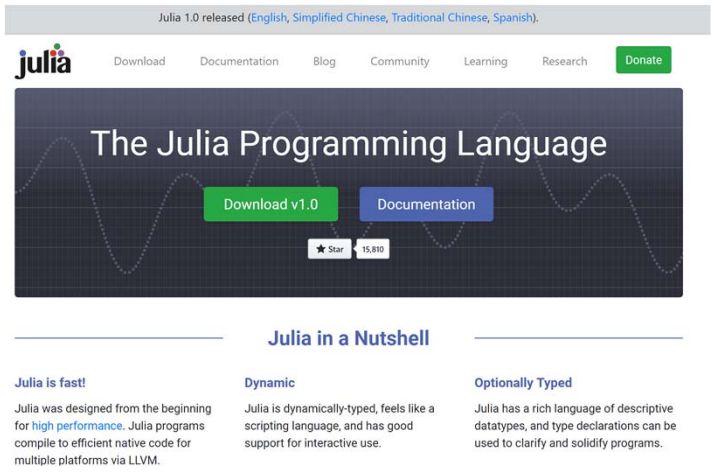
- C
- C++
- FORTRAN
- …

Interpreted language

- MATLAB
- Python
- Julia: Promising newcomer
- …

Bezanson et al, Julia: A Fresh Approach to Numerical Computing, *SIAM Rev.*, 59(1), 65–98.

Julia: https://julialang.org/ (Use Julia 0.7)



Previous stable release (v0.7.0)

Windows Self-Extracting Archive (.exe) [help]	32-bit	64-bit	
	Windows 7/Windows Server 2012 users also require TLS "Easy Fix" update, and Windows Management Framework 3.0 or later		
macOS Package (.dmg) [help]	10.8+ 64-bit		
Generic Linux Binaries for x86 [help]	32-bit (GPG)	64-bit (GPG)	
Generic FreeBSD Binaries for x86 [help]	64-bit (GPG)		
Source	Tarball (GPG)	Tarball with dependencies (GPG)	GitHub

You may be interested, especially as an existing package author or maintainer, in downloading Julia v0.7.0, shown below. Versions 1.0.0 and 0.7.0 are largely equivalent, with the primary difference being that 0.7.0 includes deprecation warnings for functionality and behavior changed between previous releases and 1.0.0. For example, invoking deprecated methods will emit a warning in 0.7.0 but will cause an (intentional) runtime error in 1.0.0.

Local computer (Linux/Mac)

- Download binary https://julialang.org/downloads/
- Unzip
- Run!

Console mode

- Running a script

  include(“name.jl”)

- Different modes
  - Command mode
  - Help mode (type “?”)
  - Shell mode (type “;”)
  - Install package (type “]”)

Installing packages

- Most commonly used

  PyPlot / Gadfly: Plotting

  IJulia : Notebook

  https://github.com/JuliaPy/PyPlot.jl

  http://gadflyjl.org/stable/

  https://github.com/JuliaLang/IJulia.jl

- Many others and quickly updated (do not go through them at the beginning!)

  https://pkg.julialang.org/

Two modes

- Notebook (same concept as iPythonNotebook if you are familiar), now called "Jupyter"

- Console
  - Interaction with Julia https://docs.julialang.org/en/stable/manual/interacting-with-julia/

- Current stable version: v0.7 (1.0 is available but recommend 0.7 for this semester!). In each homework, please let your GSI know the version of Julia you are using. Usage of versions before v0.7 is highly NOT recommended.