Course intro

Friday, August 23, 2024 4:45 PM

APPM 4720/5720 Scientific ML

I hope to quickly give an accurate taste of the course in the 1st week so you can decide to drop or not

HW #1 is due this Friday!
HW #2 already posted also

It's an elective class, hopefully not too hard
... but not easy, especially for 5720
... and I will grade
You'll get out what you put in. I assume most students are self motivated

As a special topics, it'll be less organized,
I'll be learning along the way too.

Target is getting PhD students ready for research,
have easy ex. done already so have confidence to try new stuff.
Secondary: industry training.

Theme is "debugging" / VV + UQ, not just code

- Compartmentalize
- unit tests
- "cheating", ie. problems you already know answer to

Also, peaking "under-the-hood" of math, code, memory

Course intro: outline and logistics

Friday, August 23, 2024 5:01 PM

Semester Plan:

1/3 ① Building Blocks (order may change)

git, IDEs, CURC profile, logging + math modeling + software/work flow + math/calculus

ML + Stat.
- neural nets
- training
- approx. theorem
- validation ...

Numerical Analysis
- linear algebra
- ODEs, PDEs
- roundoff error

Optimization
- constrained + unconstrained
- types of sol'n
- descent methods
- Lagrange multipliers, duality

HPC
- computer architecture
- auto diff

2/3 ② SciML Based off recent papers, guest lectures

(short overview coming shortly)

Logistics

website: github.com/cu-applied-math/SciML-Class

has syllabus ... also use Canvas + Gradescope

70% HW, 20% project, 10% participation.

drop lowest

demos/labs on Fridays.

BRING LAPTOPS

Textbook: none, but see syllabus for resources

Office Hours: TBD

Coding: undergrads: pick Python (PyTorch) or Julia

grads: possibly do both!

We'll be trying group HW / peer grading.

Prereqs: APPM 4600 numerics (or 4650, CSCI 3656, MCEN 3030)

Waitlist: I'll let in