Project

Overview

- Investigate an advanced topic
- Should have a substantial computational componenent
- Database of topics to select from, or bring your own
- Homeworks will continue, but will be lighter
- Can be theoretical, but is meant to be “hands-on” so most will be very computational

Deliverables

- Final presentation (all due April 26):
  - Approximately 10 minutes in length (more later)
  - A detailed description of the problem you are studing
  - An outline of the computational setup
  - A critique or discussion.

- Reflections report (due May 3):
  - A one-half to one page summary of your project.
  - Include a description of the division of work on your project.
  - Include a critique and what you would like to do if you had more time.

How + timeline

- Pairwise: with 40 in the class, we need ~20 projects

- Timeline:

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W March 15: spring break
W March 22: Topic selection + peer feedback
W March 29: Project goals and workflow, a list
W April 05: Project outline
W April 12: Initial results
W April 19: Initial results
W April 26: All slides due
W April 26: Presentation, peer feedback
M May 1:    Presentation, peer feedback
W May 3:    Presentation, peer feedback
W May 3:    Reflections due
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Topic samples

1. A 1D or 2D WENO solver for the Euler Equations
2. Adaptivity in Finite Elements
3. Finite element for Navier Stokes equations
4. High order DG methods for the wave equation
5. Least-squares finite element for Stokes flow
6. High-order finite elements methods for elliptic problems
7. Low-order preconditioning for high-order methods
8. Spectral methods
9. Curl based finite elements
10. Div based finite elements
11. Fast methods for finite element assembly
12. Finite element form compilers
13. A 2d Godunov scheme on unstructured meshes