About the Class

• Me: Luke Olson

• TAs:
  • Ryne Beeson
  • Nathan Bowman
  • Erin Carrier
  • Pete Sentz
What is “Numerical Methods”?
What is “Numerical Methods”?

numbers…and not just one!

algorithms: what/why/how
Errors are everywhere

```python
In [ ]:
  x = 0.1
  while x != 1.0:
    print x
    x = x + 0.1
```
Things are expensive

\[ A = \begin{bmatrix} \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \end{bmatrix} \quad B = \begin{bmatrix} \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \end{bmatrix} \]

\[ A \times B \]
Objectives: Set #1

- Develop a working knowledge of Python and Numpy
- Understand the limitations of computing with finite precision
- Use numerical design and measurement to simulate and study a problem

Build a numerical experiment
Objectives: Set #2

• Restablish linear algebra in a computational setting
• Build a view of a problem in the context of matrices and vectors
• Solve and identify the elements of solving a linear system
• Compute eigenvalues/eigenvectors for different applications

Build a numerical experiment with arrays of data
Objectives: Set #3

• Build an intuition on approximating fundamental operations: interpolating data, integrating data, differentiating data

• See how the tools lead least-squares approximations to problems

• Establish tools to optimize in 1D and in ND

Approximate things using a chunk of data
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About the Class

• The course website:
  • go.cs.illinois.edu/cs357

• Your workflow:
  • Login with your email before class
  • Short collection of pages/videos/slides
  • Often a quiz
About the Class

• Quizzes (starting next week!)
  • Will try to give you ~24 hours
  • Very short. Very direct.
  • Two attempts to submit.
  • 50% credit if submitted after the deadline with 3 days.
  • Deadline: 10min before class.
About the Class

• Homework (starting Friday!)
  • Same system
  • Released on Friday’s. Due by the next Friday at 4pm.
• 1 submit
• 50% credit if submitted after the deadline with 7 days
Exams

- 3 exams
  - Midterm
  - Midterm
  - Final (comprehensive)

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<thead>
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<tbody>
<tr>
<td>HW</td>
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<tr>
<td>Final</td>
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Grading Scale

• No curve

• As: [90, 100]

• Bs: [80, 90)

• Cs: [70, 80)

• Ds: [50, 70)

• Fs: <50
Questions?

• Questions about the homework: Piazza

• Questions about grades (quiz scores, exams, homework issues, etc): TA Erin Carrier

• Bugs/Issues with the web: TA Ryne Beeson
Office hours

• 11:30-1pm Monday
• 10:30-12:30 Wednesday
• 4:30-6pm Wednesday (Discussion-like for 1 hour)
• 4:30-6pm Wednesday (Discussion-like for 1 hour)
• details on the web
Questions...so...far...