Computational Mechanics

ME 3255 Spring 2020

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Github page: https://github.uconn.edu/rcc02007/Computational_Mechanics/
JupyterHub server: https://compmech.uconn.edu/

Course Goal

The overall goal of the course is learn to frame engineering problems as computational methods. Once we can communicate our engineering problems to Python code (or any other computer language) we can use standardized computational methods to solve those problems.

->**Course Website and Syllabus**<-

Computational Mechanics Materials

- Course materials are free and open source
- Combination of work from
  - Prof. Ryan C. Cooper at the UConn
  - Engineering Computations Modules from Prof. Lorena A. Barba and doctoral student Natalia C. Clement at the George Washington University, Mechanical and Aerospace Engineering Department.
- Learning modules include:
  - 3-4 Jupyter notebooks
  - Address an area of application or skills in computational mechanics
  - Python is the programming language

Motivation

Figure 1: Why do elevators have mirrors?

Motivation

Figure 2: Solution to traffic = faster cars?

Motivation

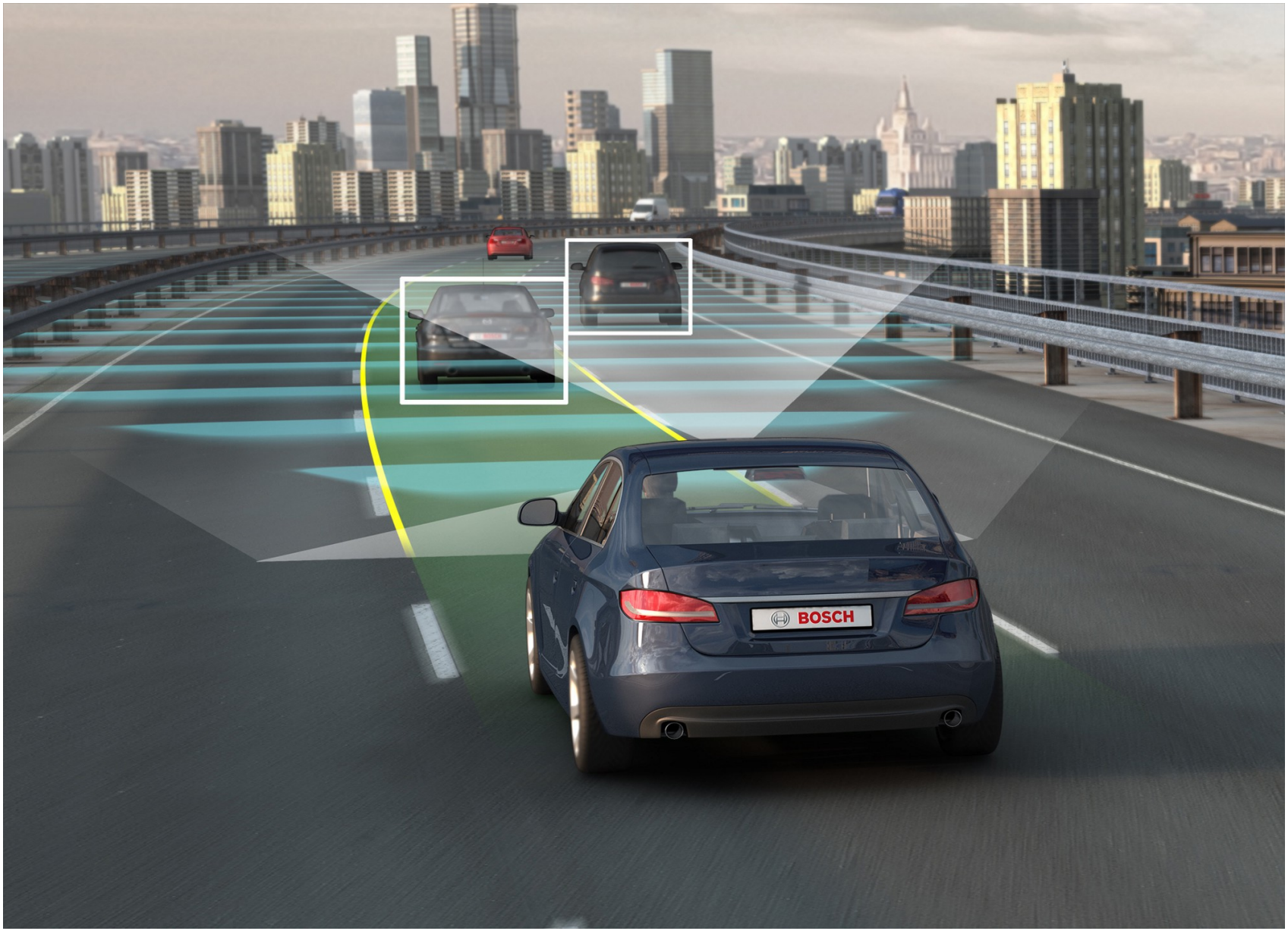

Figure 3: Solution to traffic = smarter cars

Learning Modules

You have been assigned to either the 9:30-10am or 10:15-10:45am slot

Lab times: TTh 9:30-10:00 AM and 10:15-10:45 AM, EII rm 202

1. CompMech01-Getting Started
2. CompMech02-Analyze-data
3. CompMech03- Initial Value Problems
4. CompMech04- Linear Algebra
5. CompMech05- Boundary Value Problems

Grading

Item	Percent	Requirement
Participation	30 %	Complete the notebook exercises and discussion questions
Homework	30 %	Complete the end-of-notebook problems
Projects	40 %	Complete the module project and submit to Github

Truly Random number exercise!

Course Expectations

Students are expected to create numerical approximations for linear and nonlinear problems, understand approximations due to floating point operations and numerical approaches and solve differential equations using numerical differentiation and integration. Students are also expected to learn basics of git version control, Python functions and programming best practices.

Coursework

- Participation
  - Meet for 30 min $\times 2$/week.
  - Starts on Thu 1/23 in ME computer lab (EII room 202)
  - Review upcoming notebook and complete as exercises before lecture
  - Have 30-min to ask questions and complete the notebook
  - Come to lecture with **questions**
  - Submit a pdf of completed notebook at the end of the lab session
- Homeworks:
  - end of notebook **Problems**
  - due before next lab
  - Submit a pdf of completed notebook at the end of the lab session