Introduction

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Technological developments

- data is super plentiful
- storage, transmission of data is easy
- computers are super fast (and many are super cheap)
- high level programming languages make it easy to do complex stuff

Linear algebra and matrix methods

- branch of math with 200 year history (at the least . . .)
- applied since development of computers (1950s)
  - economics
  - control
  - signal processing
  - simulation
  - statistics and data modeling
- applications have *exploded* since 2000 or so
  - large-scale machine learning
  - image processing
  - medical imaging
  - communication systems
  - embedded intelligent systems
- drift from physics-based towards information-based applications

What EE103 is about

- ▶ we will take you from zero to functional in the big world of modern information-based applications (at least, on the math end)
- ▶ you'll learn
  - – the math, and how it's connected to the real world
  - – about some cool applications (and some not cool ones, too)
- ▶ and, *you'll actually do stuff with it*
  - – data fitting and classification
  - – tomography
  - – control
  - – portfolio optimization

  (to mention just a few things)
- ▶ we'll de-mystify some things that (might) look like magic to you now

Prerequisites

you should know:

- ▶ minimal programming
  (CS106A is co- or prerequisite, but more than you need)
- ▶ some calculus
  (Math 51 is more than you need)

you don't need to know:

- ▶ any linear algebra
- ▶ any of the applications

Requirements

- attendance at lecture
- attendance at weekly section
- weekly homework
- midterm
- final

Julia

we'll be using Julia, a relatively new computer language

- ▶ open source (like all real languages)
- ▶ can be used to write simple scripts (like matlab)
- ▶ but also is very efficient
- ▶ supports really fancy stuff (that we won't use)
- ▶ is still under development, but reasonably stable

Course web site

- all official course info on course web site
- if you find an error or inconsistency on the web site, let us know
- we'll update it often, so please check back and refresh your browser

The book

Introduction to Applied Linear Algebra
Vectors, Matrices, and Least Squares

Stephen Boyd (Stanford) & Lieven Vandenberghe (UCLA)

▶ online at course web site
▶ in final draft form, not totally consistent with slides
▶ we will quietly update it with corrections, updates
▶ so, don't print it
▶ let us know when you find typos, inconsistencies
▶ yes, you *will* read almost all of it over the quarter

Your instructors this quarter

- Stephen Boyd
- David Tse
- . . . and some fantastic section leaders / CAs