Math 313/513 in Spring 2022

Martin Bies

November 19, 2021

Contact

- Instructor: Martin Bies,
- Email: mbies@sas.upenn.edu,
- Office hours: TBA.
- Grader: TBA.

Lecture – Generalities

- Lecture times: Tuesday and Thursday, 10:15am – 11:45am.
- Lecture modus: In person (at least as of this writing) – lecture notes will be provided.
- Webpage: TBA (see https://catalog.upenn.edu/courses/math/ and https://martinbies.github.io/teaching/).
- Textbook: Gilbert Strang, Introduction to Linear Algebra, Fifth Edition (2016), ISBN: 978-09802327-7-6,
- Prerequisites: Math 240 or 260. Elementary programming skills in `Python`.

Lecture – Outline

This course covers topics from linear algebra such as:

- basic notions of linear algebra (vector spaces, linear maps, basis, ranks, ...),
- solving linear equations (Gaussian and Gauss-Jordan elimination, determinant, ...),
- matrix decompositions such as LU, LDU, SVD, ...,
- eigenvectors and eigenvalues, diagonalizability,
- orthogonal transformations, unitary transformations and the spectral theorem.

We exemplify these concepts in applications. These include:

- Markov processes, Markov matrices and steady-state vectors,
- ODEs,

- Fourier analysis,
- linear regression,
- theorem of principal axes in classical mechanics.

Homework

- There will be weekly homework assignments.
- This course has a **computational** focus. The homework assignments will include programming tasks. Basic familiarity with the programming language `Python` is expected.

Exams and grading

All exams are (as of this writing expected to be) in person. The grades will be determined as follows:

- Homework: 30%
- Mid term 1 (date TBA): 20%
- Mid term 2 (date TBA): 20%
- Final exam (date TBA): 30%

Please acknowledge the following:

- Late homework/exam solutions will not be accepted and count as zero, except for reasons such as serious illness, family emergency, etc. In such cases you must provide documentation and use the *Course Absence Report system* in advance. I retain the right to decide how to handle these cases.
- The *Code of Academic Integrity* will be strictly enforced. Cheating on homework or exams (copying/sharing work with other students, etc.) will result in a score of zero on that work and referral to the *Office of Student Conduct*.

Students with disabilities

Any student requiring special accommodations is encouraged to contact me and the *Office of Student Disabilities Services* as soon as possible.