Numerical Linear Algebra and Optimization

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Textbook
Numerical Linear Algebra by Trefethen and Bau. Recommended text: Linear Algebra and Learning from Data by Gilbert Strang.

Who should take this course?
The course is aimed at students interested in scientific computing. Along with an introductory numerical analysis course, this is a foundational course. This means that if you’re interested in using mathematical or statistical tools for processing data or simulation, then you will almost surely need tools from numerical linear algebra.
You will see and work with a range of applications of this material. Familiarity with an undergraduate linear algebra course is a must, and prior computing experience is assumed.

What is the material we’ll see in this class?
In this class we will cover a variety of topics in contemporary numerical linear algebra, with an eye towards applications. We will develop, analyze and implement a range of algorithms to understand how they work in practice and in theory. All methods will be developed and tested in Matlab. Some prior familiarity with Matlab is assumed.

Assessment
Student learning will be assessed both for theoretical and computational understanding of the material.
Homework: 40%, Midterm: 15%, Final Project: 15%, Final - 30%.
Students in 709 will be assigned additional homework problems.