Spring Quarter 2021
EC ENGR 133A. Applied Numerical Computing

Course objectives: Provide an introduction to numerical computing and numerical linear algebra, with applications to problems in engineering and data analysis.

Catalog description: Introduction to numerical computing/analysis; analytic formulations versus numerical solutions; floating-point representations and rounding errors. Review of MATLAB; mathematical software. Linear equations; LU factorization; bounds on error; iterative methods for solving linear equations; conditioning and stability; complexity. Interpolation and approximation; splines. Zeros and roots of nonlinear equations. Linear least squares and orthogonal (QR) factorization; statistical interpretation. Numerical optimization; Newton method; nonlinear least squares. Numerical quadrature. Solving ordinary differential equations. Eigenvalues and singular values; QR algorithm; statistical applications.

Course material

- *Introduction to Applied Linear Algebra: Vectors, Matrices, and Least Squares,* by S. Boyd and L. Vandenberghe. Available online at https://web.stanford.edu/~boyd/vmls/.
- Additional lecture notes, slides, and exercises available at the CCLE class website.

Course requirements

- Weekly homework. Most homework assignments will involve MATLAB/Octave or Julia programming.
- A project.
- Open-book midterm exam.
- Open-book final exam.

Office hours:

- Prof. Vandenberghe: Tuesday and Thursday after the lecture (5:50pm–6:30pm).
- Xin Jiang: TBD.