

EE263: Matrix Methods: Singular Value Decomposition

- ▶ ee263.stanford.edu
- ▶ instructor: Sanjay Lall
- ▶ based on EE263: Linear Dynamical Systems, by Stephen Boyd.

EE263 and related courses

- ▶ new in 2025: ee263 has been split into two courses
- ▶ new title: *EE263: Matrix Methods: Singular Value Decomposition*
- ▶ new follow-on course: *EE363: Linear Dynamical Systems*
- ▶ major emphasis
 - ▶ how to apply linear algebra
 - ▶ practical applications from many disciplines
 - ▶ SVD: a tool for handling the non-ideality of the real world

Many applications

- ▶ automatic control systems
- ▶ signal processing
- ▶ communications
- ▶ economics, finance
- ▶ circuit analysis, simulation, design
- ▶ mechanical and civil engineering
- ▶ aeronautics
- ▶ navigation, guidance
- ▶ machine learning

References

- ▶ class web page: ee263.stanford.edu
- ▶ complete notes will be posted
- ▶ many books to choose from, *e.g.*,
 - ▶ *Introduction to Applied Linear Algebra — Vectors, Matrices, and Least Squares*, Boyd and Vandenberghe (the textbook for engr108) covers some topics from ee263, but at a more introductory level. Available online at <https://web.stanford.edu/~boyd/vmls/>
 - ▶ *Numerical Linear Algebra*, Trefethen and Bau
 - ▶ *Matrix Analysis and Applied Linear Algebra*, Meyer

Prerequisites

- ▶ a previous course in linear algebra (*e.g.*, engr108 or math104)
- ▶ exposure to probability
- ▶ coding in a high-level language
 - ▶ we will use Julia (similar to Python)

Course mechanics

- ▶ class web page: ee263.stanford.edu
- ▶ edstem.org
- ▶ canvas
- ▶ gradescope
- ▶ videos on canvas (wide-shot only)

Course requirements

- ▶ weekly homework
- ▶ in-class mid-term exam
- ▶ in-class final exam
- ▶ check the website for updates and timing