Chapter 0: Introduction

Ketan Rajawat

Welcome to the course

- Module: Introduction to Linear Algebra (EE951)
- Instructor: Ketan Rajawat
- Contents:
  - Vectors & matrices
  - Inner products & norms
  - Linear systems, LU & QR factorization
  - SVD, fundamental spaces
  - Linear independence, bases
  - Solving Ax=b
  - Eigenvalues

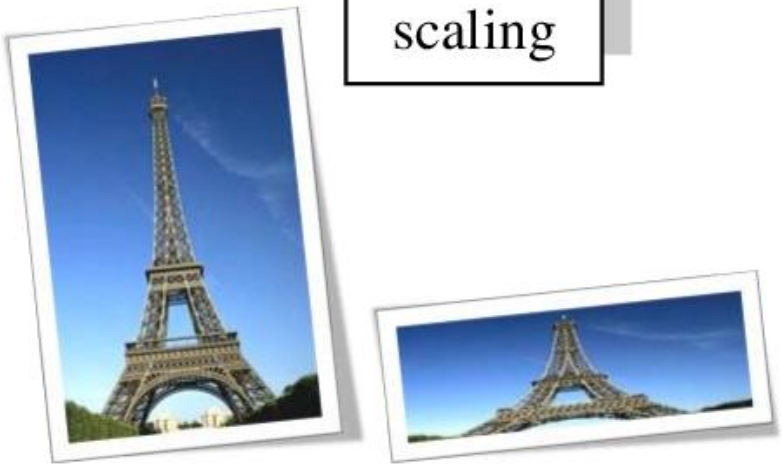
Why Linear Algebra?

https://xkcd.com/

Linear Algebra at every step

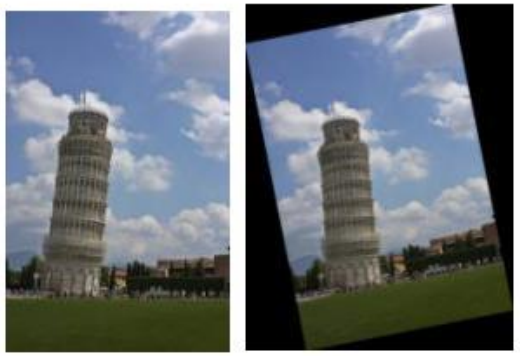
$$A = \begin{bmatrix} s_x & 0 & 0 \\ 0 & s_y & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

scaling



$$A = \begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

rotation



$$A = \begin{bmatrix} 1 & 0 & x_1 \\ 0 & 1 & y_1 \\ 0 & 0 & 1 \end{bmatrix}$$

translation

Caridade, Cristina M. R.. "Image processing to Motivate Linear Algebra Students." (2012).

Evaluation

Component	Total weightage
Assignments (to be submitted)	20%
Quiz	15%
Attendance in Discussions	10%
Endsem Exam (online)	55%

Administrivia

- Missed quiz + valid documents => make-up quiz
- Best $n-1$ out of n assignments to be considered
- Missed endsem exam => $\boldsymbol{I}$ grade

- Notes, slides, videos available every week
- Other references:
  a. Strang, Gilbert. Linear algebra for everyone. Wellesley, MA, USA: Wellesley-Cambridge Press, 2020.
  b. Boyd, Stephen, and Lieven Vandenberghe. Introduction to applied linear algebra: vectors, matrices, and least squares. Cambridge university press, 2018.

How to get the most from this course?

- Time spend on a video $\geq 1.5 \times$ duration of video
- Sit with pen & paper, pause and rewind often
- Read the notes!
- Do not look up the solutions to assignment problems on the Internet/chatGPT, solve them yourselves, discuss with friends, discuss with me, post your queries on the forum, etc.

Thank You

Next: Vectors