Intro / Background

First a bit about Linear Algebra's place in math / science.

Then we will talk about what linear algebra **IS**.

Uses

- L.A. is one of most fundamental and widely used branches of math

It is a field that gives insight into the structure of all mathematics

Its not just about foundations either. While linear algebra is of interest in its own right its power comes from how we can use the techniques in so many advanced and different fields.

- Differential Equations
(which also connect to almost every field of science)
   ↑
   Wronskian

- Physics

- Economics

- Data Science
(Statistics, Machine Learning)

- Computer science

- Everything else

Pre-reqs

While there are officially some pre-reqs, the course is almost completely self contained. May use some _very_ basic algebra, trig, calc This means everyone is starting from same level.

☆ Beginning material may seem very basic and it is.

Its a trap!!

People see the basic material and tune out or skip class thinking it will be easy to catch up. But material turns the corner into abstract unfamiliar, and difficult fairly quickly.

If you don't keep up from day 1 you will get lost.

Intro — What is linear algebra?

At the most basic, linear algebra is about solving linear equations, usually solving several equations simultaneously.

Where do we find such systems of linear equations?

- (Abstract) "Spaces" with "linear" structure. Won't be specific now but most of what we are used to dealing with in math falls into this category

    Ex: $\mathbb{R}$ (real numbers)
    $\mathbb{R}^2, \mathbb{R}^3, \ldots$
    Certain classes of functions (like continuous functions, differentiable, etc.)

- (Applied) Fields where you deal with a lot (massive amounts) of data that can be written out simply

To continue, we need to go to the textbook.