Source: KBe2020math530floIndex

Looking forward

- Will use canvas's discussion board in the future.
- Assume matrices have real numbers

Solving with Matrices

- Elementary matrices (like $\begin{bmatrix} 1 & -2 \\ 0 & 1 \end{bmatrix}$)
- Steps walk through
  - Start with $\begin{bmatrix} a & b \\ d & e \end{bmatrix}$ (the coefficient matrix).
  - You want to get somewhere such that $\begin{bmatrix} 1x \\ 0y \end{bmatrix} = \begin{bmatrix} c \\ f \end{bmatrix}$
  - And ultimately $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} ans_x \\ ans_y \end{bmatrix}$
  - srcD3SolveWithMatricies.png

Matrix Inverse Formula

- I should technically know this already.

Derivation

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} w & x \\ y & z \end{bmatrix} \begin{bmatrix} aw+by & ax+bz \\ cw+dy & cx+dz \end{bmatrix} \therefore \quad \begin{aligned} aw+by &= 1 \\ cw+dy &= 0 \\ ax+bz &= 0 \\ cx+dz &= 1 \end{aligned}$$

- There's two 2 variable equations. srcIdentityMatrixFormula.png

Matrix Operations

- If we have a set of objects that are almost groups in under both addition and multiplication, then it's called a field
  - 2x2 Matrices aren't quite close enough on the multiplication (too many no inverses) but we can work with other sizes. ### Vector Products
- Matrices of dimension nx1
- What multiplications on vectors are "nice"?
  - Transpose the first (left) one and multiply normally, then squish 2x2 into 2x1
  - Cross product
  - Element wise (is closed)
  - Take every element and multiply them all together, and then duplicate?
    - No, no identity
  - Any one to one mapping?

- No, identity doesn't work if it's on the left.