Parker Glynn-Adley — http://pgadley.ca
- office hours booking on website
- blog post each week, has info on the week
- syllabus under pages for MAT1841-2018
- there is a webception!

textbook: Marsden & Tromba. Vector Calculus 6th Edition

- 6 homework assignments
  - 5% each
  - turned in @ tutorial
- Midterm 30%
- Exam 40%
- week 5 is mock midterm
  - friday June 8th
- Eric Moore has solutions
  - used to teach course before!

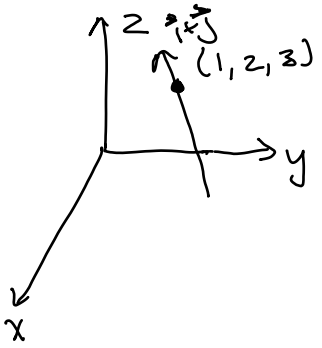
Vectors: three different notations

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = (x, y, z) = x\vec{i} + y\vec{j} + z\vec{k}$$

standard basis

Ex) $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + 3\vec{j} = \begin{bmatrix} 1 \\ 2+3 \\ 3 \end{bmatrix} = \begin{bmatrix} 1 \\ 5 \\ 3 \end{bmatrix}$

Ex) Write the parametric equation for a line passing through (1,2,3) in the direction $\vec{i}+\vec{j}$



$(x, y, z) = (1,2,3) + t(\vec{i}+\vec{j})$

start @ (1,2,3) add a stretched copy of $\vec{i}+\vec{j}$

$= (1,2,3) + t(1,1,0)$

$= (1+t, 2+t, 3)$

why called parametric? depends on t where you end up on the line

Lengths and Angles

The Pythagorean Theorem says

$\|(x,y,z)\|^2 = x^2+y^2+z^2$

Nota: $\|\vec{v}\|$ is the LENGTH vector $\vec{v}$
↓ notation

Def^n: The DOT PRODUCT

$$\begin{bmatrix} a \\ b \\ c \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = ax + by + cz$$

Fact $\vec{u}\cdot\vec{v} = \|\vec{u}\|\,\|\vec{v}\|\cos\theta$
where θ = angle between $\vec{u}$ & $\vec{v}$

Defn: Two vectors are ORTHOGONAL if $\theta = \frac{\pi}{2}$ (equivalently $\vec{u}\cdot\vec{v} = 0$)

Two vectors are PARALLEL if $\vec{u} = \lambda\vec{v}$ for some number λ

Ex) for what values of λ are $\vec{u} = (5, \lambda, 3)$ and $\vec{v} = (\lambda, \lambda, 2)$ are orthogonal?