

Calc III Notes

Pierson

August 25, 2025

1 Multivariable calc goals

- vectors and geometry of \mathbb{R}^n
- functions of several variables diff and int
- higher dimensional versions of FTC
- find them for line integrals
- greens them
- stokes them
- divergence them

2 Chapter 12: vectors and geo of space

-

$$\mathbb{R} = \text{line}$$

$$\text{dist}(x,y) = |y - x|$$

-

$$\mathbb{R}^2 = \text{Plane}$$

Orders pairs of (x,y) of real numbers

-

$$\mathbb{R}^3 = \text{space}$$

ordered triples of (x,y,z) of real numbers

right-hand rule: point fingers toward pos x-axis and curl towards pos y-axis, thumb should point to positive z

R^n = n-tuples (x_1, x_2, \dots, x_n) n-dim space

Distance D from (0,0) to (x,y)

$$D^2 = x^2 + y^2$$

Distance D from (0,0,0) to (x,y,z)

$$\sqrt{x^2 + y^2 + z^2}$$

3 Chapter 13: vector functions

4 Chapter 14: partial derivate

5 Chapter 15: multiple integrals

6 Chapter 16: vector calculus