Multivariable functions

1. Examples of multivariable functions
   - What is a parametric curve?
   - What is a vector field?
2. Graphs of functions
   - How to draw the surface?
   - What is a level set?

3. Analysis on multivariable functions
   - How do we define *continuity* of a multivariable function?
   - How can we generalize the definition of differentiability of single variable functions to multivariable functions?

Integrals on multivariable functions

1. How to compute the *length* of a curve?
   - How do define length?
2. How to compute the area of 2-dimensional domain?
   - What is an *iterated* integral?
3. How to compute the volume under the surface?
   - What is a *multiple* integral?
   - What is a difference between iterated integral and multiple integral?

Homework

- Reading assignment
  - Chapter §2.1 ~§2.2
- Writing assignment (due **Sep. 14th, 11:59pm**)
  - Answer the following questions. Type or write neatly, convert to pdf, then upload to LMS.
    1. (6 points) Let H be a plane in $\mathbf{R}^3$ defined by the equation

       $$ax + by + cz + d = 0$$

       for $a, b, c, d \in \mathbf{R}$.
       (a) In what condition does the vector

       $$\mathbf{v} = (v_1, v_2, v_3)$$

       is *parallel* to the plane H?
       (b) Determine the formula of a, b, c, d when the plain H passes through the origin $\mathbf{0} = (0, 0, 0)$ and is parallel to

       $$\mathbf{v} = (v_1, v_2, v_3), \quad \mathbf{w} = (w_1, w_2, w_3).$$

    2. (6 points) Given an irregular domain such as figure below, explain how to compute the area using iterated integral (or double integrals).