

# 1 Lab 10 - Parametric Curves

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## Goals

The goals for this lab are:

1. Practice using a `loop` control structure to **create and repeat parametric curves**.
2. Practice using `random` to produce desirable colors and design layout
3. Practice using parametric curves to create circles, spirals, ect. and converting from **parametric coordinates** to **Cartesian coordinates**.
4. Study pieces of art that use many curves and try to **recreate** at least one element of the piece.

## Modality

**Pair or Individual (per instructors specifications)**

## Details

**Task:** You must create two different images using Processing each of which are *created using parametric curves*. This may include creating a curve using polar coordinates (r, theta) that are converted into Cartesian (x,y) coordinates.

**The first sketch** should plot a common parametric curve (see Resources for some examples) and adjust the parameters to create several versions of the same curve. (i.e.: a rose with 4 petals and a rose with 7 petals).

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<sup>1</sup>Lab developed by Katelyn Hicks under supervision of Zoë Wood

**The second sketch** uses parametric curves to model a piece of art or a photograph. The default model for this sketch is the sky from Vincent van Gogh's *Starry Night*, but with the instructor's approval another image can be recreated. The resulting sketch does not need to recreate the entire image, but can model a portion of the image based on the level of difficulty and approval from the instructor.

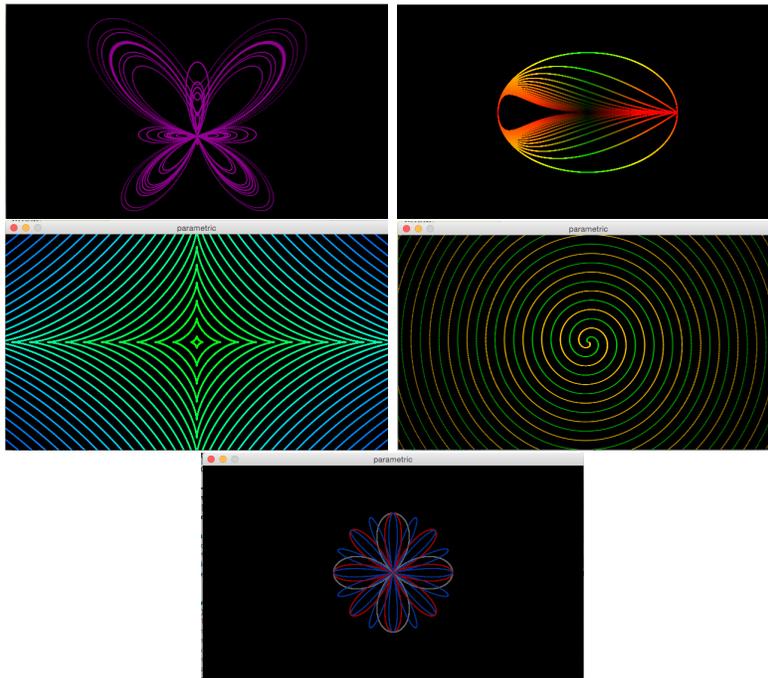


Figure 1: An example for the first image: Using common parametric curves and adjusting the parameters for different sizes, colors, ect.

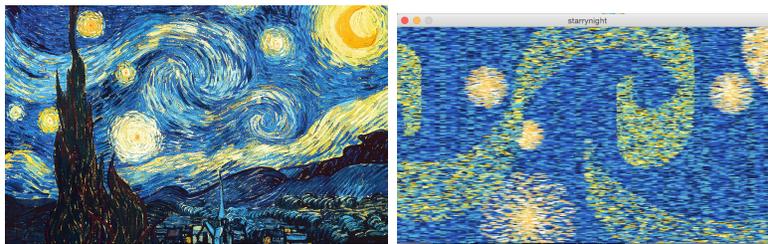


Figure 2: This example uses parametric curves to represent the sky and stars in Vincent van Gogh's *Starry Night*, specifically using ellipses to try and represent van Gogh's brushstrokes.

Your lab must:

- have two separate sketches using parametric curves
- include the original image being recreated for the second sketch

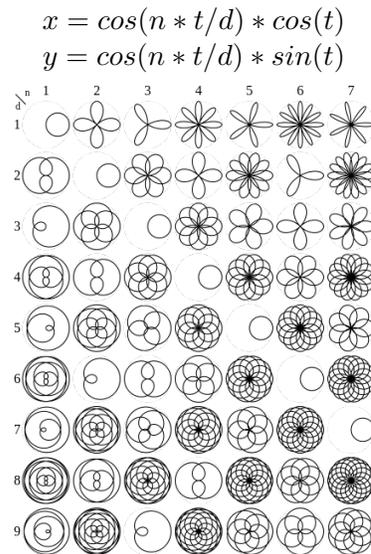
- be at least 400 x 400
- be in color
- use `random` appropriately

### Demo:

In order to receive credit for this lab, you and your partner must demo your sketch to your instructor.

### Resources:

- Parametric Rose: <http://mathworld.wolfram.com/Rose.html>



- Parametric Teardrop: <http://mathworld.wolfram.com/TeardropCurve.html>
- Parametric Butterfly: <http://mathworld.wolfram.com/ButterflyCurve.html>
- Parametric Astroid: <http://mathworld.wolfram.com/Astroid.html>
- A simple for loop from 0 to  $2\pi$ :

```
float pi = 3.141592653;
for (float degrees = 0.0; degrees <= 360.0; degrees += 1.0) {
float radians = pi * degrees / 180.0;
float x = //some parametric equation;
float y = //some parametric equation;
...
}
```