CECS 456: HW4 (NumPy Assignment)

Due date: April 6, 2021 11:59pm
Total: 5 points

1 Boundary Extraction and Polar Transformations

You are assigned with the task of extracting elliptical/circular boundaries from collections of points. You are given data of dimensions $1000 \times 9430 \times 2$. In other words, you have 1000 collections, each containing almost 10,000 pairs of (x, y) coordinates. Do the following:

(a) Load the arrays (use the H5PY library for this task) from the file "ellipse_data.hdf5". The dataset string is "data"

(b) Get the boundary points. (Hint: get the max and min y at each x. Then filter that list of points to have a maximum of 2 points per x value.)

(c) Perform the polar transformation:

$$r = \sqrt{x^2 + y^2} \tag{1}$$

$$\phi = arctan(\frac{y}{x}) \tag{2}$$

(d) Plot $r(\phi)$ against ϕ

Your submission should contain the code along with the *following* 10 plots: indices (0, 100, 200, 300, 400, 500, 600, 700, 800, 900). Do **not** shuffle the data or you will not submit the correct indices.