This document is similar with the instruction manual for Cycle 1 - Sobol analysis.

This folder contains codes requires for calculating and presenting data for Sensitivity Analysis purpose.

This includes:

* salib\_cycle1.py
  + Main code for Sensitivity Analysis
* odegfp\_cycle1.py
  + Consist of cycle 1 ode that prints out GFP value at certain time for Sobol analysis purpose
* oderfp\_cycle1.py
  + Consist of cycle 1 ode that prints out RFP value at certain time for Sobol analysis
* Boundary Data1.xlsx
  + Consist the boundaries of each constant required for the ode of cycle 1.
* Plotting.py
  + Code for plotting the output of salib\_cycle1.py

Anything written as ‘**BOLD**’ is referring to the word (string, function or value, etc.) in the .py or .xlsx file

Notes for usage of salib\_cycle1.py

* ‘**number\_of\_sample**’ is recommended to be 2^n values.
* ‘**odeoutput**’ is used to change the ode that you are studying. Our genetic circuit consist of 2 outputs, thus 2 ode – odegfp\_cycle1.py and oderfp\_cycle1.py – and 2 choices of ‘**odeoutput**’ – ‘**gfp**’ or ‘**rfp**’ is present in our code.
* ‘**odeoutput**’ is connected to the if and elif statements in ‘**def evaluate()**’. If more output is present in the genetic circuit, then user is required to add more elif statements.
* In ‘**def writefiles()**’, ‘filename’ can be change to the user preferences. Note that the filename is recommended to be .csv.

Instruction for usage of Boundary Data1.xlsx

* 2 sheets are present in the excel sheet.

1. ‘**Boundary**’ sheet that consist of ‘**Names**’, ‘**Lower Boundary**’ and ‘**Upper Boundary**’
2. ‘**Reference**’ sheet that consist of the constants that works with your ODE or obtained through fitting experiment result.

* In ‘**Boundary**’ sheet, the upper and lower boundaries are obtained using percentage.

Instruction for usage of Plotting.py

* Code is divided into 2 section, ‘**Main Plotting**’ and ‘**Labelling Negative Value**’ sections.
* In ‘**Main Plotting**’, the ‘**Data1**’ take first and total order data from the .csv file. Note that for the line ‘**data1 = data[0:y]**’, y should be the number of constants you have.
* ‘**Labelling Negative Value**’ is an optional section. It is used to show a very small negative value from the result of Sobol Analysis that cannot be seen from the graph.

Reference:

* http://keyboardscientist.weebly.com/blog/sensitivity-analysis-with-salib
* https://github.com/kenll99minecart/IGEM\_MODEL