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

* salib.py
  + Main code for Sensitivity Analysis
* odegfp.py
  + Consist of cycle 0 ode that prints out GFP value at certain time for Sobol analysis purpose
* oderfp.py
  + Consist of cycle 0 ode that prints out RFP value at certain time for Sobol analysis
* Boundary Data.xlsx
  + Consist the boundaries of each constant required for the ode
* Plotting.py
  + Code for plotting the output of salib.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.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.py and oderfp.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 Data.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. However, depending on the number of constants, the location of the text in must be manually changed.

Reference:

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