This folder contains MATLAB scripts to fit logistic growth curves in the manuscript “Elucidating human gut microbiota interactions that robustly inhibit diverse Clostridioides difficile strains across different nutrient landscapes” by Sulaiman et al.

A description of the files/subfolders is listed below:

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| **Subfolder** | **File name(s)** | **Description** |
| input\_data | - | Contains nine .csv files with raw experimental data, including the following columns: time, replicate number, growth media, OD, and strain. Clostridioides difficile strain names are indicated in the file names. |
| - | CostFcn.m | Cost function used for parameter optimization. |
| - | LogisticGrowth.m | ODE model to simulate logistic growth dynamics. |
| - | data\_processing\_fitting.m | Performs data pre-processing and fits logistic growth mode with different regularization parameters. Fitting results with all regularization parameters are stored in ‘fitting\_output’ subfolder as .mat files. |
| - | plot\_data.m | Plot cost function as a function of regularization parameters and manually pick the optimal regularization parameter as well as the corresponding logistic growth parameters. Then plot experimental data and simulation data using the optimal logistic growth parameters. These plots are stored in ‘figures’ subfolder. |
| - | redblue.m | An auxiliary function used for plotting diverging color maps. |
| figures | - | Stores figures that are outputs of ‘plot\_data.m’. |
| - | All .mat files | Experimental data in ‘input\_data’ subfolder that are converted into Matlab file formats and used for processing and fitting. |
| fitting\_output |  | Contains .mat files with the fitting results. The file names starting with ‘opt\_res’ stores fitting results for all regularization parameters and initial parameter guesses. The other files contain the optimal logistic growth parameters identified using the optimal regularization parameter, as well as the experimental and simulation results. |