Python package "solarpy"

created at Jan/20/2019

last updated at Apr/20/2022

The corresponding paper can be found at https://arxiv.org/abs/2007.15707.

A detailed video walkthrough can be found at .

#0. This Github repository includes

> the detailed explanations and comments of each file can be found in the README file or "READEME.pdf" in each folder.

- folder "raw_results":

  > all the raw results of simulations and examples, with detailed explanations;

- folder "example_test":

  > the simluation for the example of post-selection testing;

- folder "example_IRC":

  > the simulation for the IRC Example.

- folder "simul_lasso_solar":

  > the simulation for the lasso-solar comparison;

- folder "simul_bolasso_bsolar":

  > the simulation for the bootstrap selection comparison;

- folder "application":

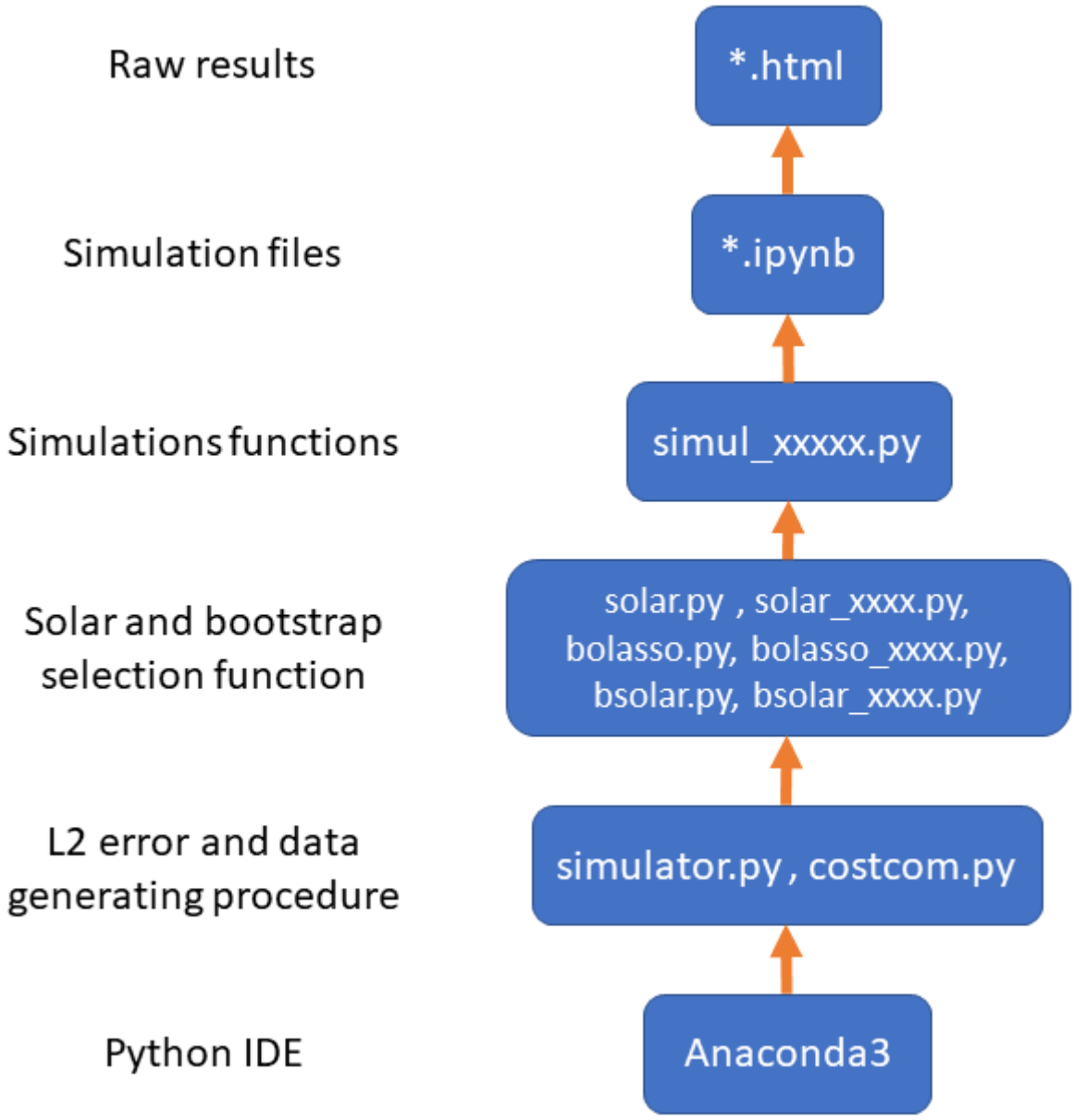
  > the real-world application;

- folder "demo":

  > the step-by-step walkthrough of Python packages "bolasso", "solar" and "bsolar.py".

to quickly verify the paper results, all raw results are saved as HTML files in the "raw_results" folder with detailed comments and explanations.

#1. This package is programmed based on the following flow.



- we program the function for L2 error and data generating procedure based on the functions from Anaconda3 (an easy-to-use Python enviroment)
- based on the function above, we define the function of solar, bolasso, and bootstrap solar function.
- based on the function above, we define the functions for plotting and calculation in simulations
-

based on the function above, we conduct all simulations in ipynb files and save the raw result of simluations as HTML.

#2. Remarks

About the Python and iPython codes

- This package
    - was originally developed at Jan 2019 on Ubuntu 18.04 using Anaconda3 version 2019-03 (under the Intel MKL C++/Fortran library).
    - passes the unit test on Ubuntu 20.04 using Anaconda3 version 2021-04 (under the Intel MKL C++/Fortran library).
- In each ".py" and ".ipynb" file I carefully and thoroughly explain
    - the meaning of every step;
    - the meaning of inputs and output;
    - the purpose of each function;
    - how each step corresponds to the paper.
- the simulations and examples are done in ".ipynb" files;
- all the ".py" files only contain the supporting function for simulations and examples.
- at the end of each ".py" file, I add a testing module for debug. You can simple run each ".py" file at terminal using "python" or "python3" command. If no bug are reported, the package is bug-free.
- The Python files automatically export the raw simulation/example results as ".html" files, which can be found at the "./raw_results" folder; the numerical results are automatically saved as ".p" files at the "numerical_result" subfolder at each simulation folder.

About replication

- To replicate the simulation **after you read though the detailed explanation and comments in each ".ipynb" file**, you just need to
    - open each ".ipynb" file in Jupyter Lab (or Jupyter notebook),
    - click the "Kernel" menu
    - click "Restart Kernel and Run All Cells".
    - **you may want to read the comments in ".ipynb" files carefully before you replicate bolasso simulations (since it could take very long time).**