3D VISUALIZE SOFTWARE: DATA

USER MANUAL

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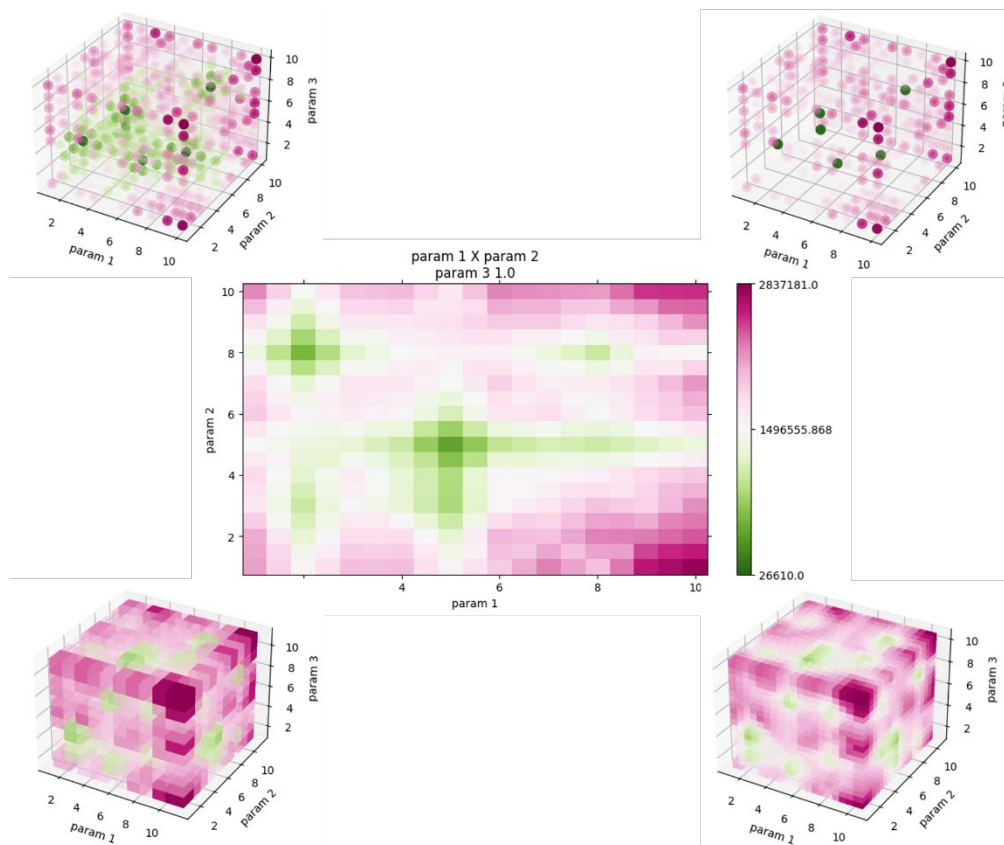
TABLE DES MATIERES

HOW TO INSTALL IT?

REQUIREMENTS

SOFTWARE REQUIRED

This program run with **Python 3.9.5**, previous or later version may not run properly.

https://www.python.org/downloads/release/python-395/

PYTHON MODULES REQUIRED

Module name	Version required (Previous or later version may not run properly)	Website
Matplotlib	3.4.2	*https://matplotlib.org/*
NumPy	1.20	*https://numpy.org/*
SciPy	1.7.0	https://www.scipy.org/
PyQt5	5.15.2	*https://www.riverbankcomputing.com/software/pyqt/*
QtRangeSlider	0.1.5	https://pypi.org/project/QtRangeSlider/
openpyxl	3.0.7	https://openpyxl.readthedocs.io/en/stable/

Command line in your interactive Python prompt, to check and download missing modules:

pip install matplotlib NumPy pyqt5 qtrangeslider openpyxl

OPTIONAL

SOFTWARE

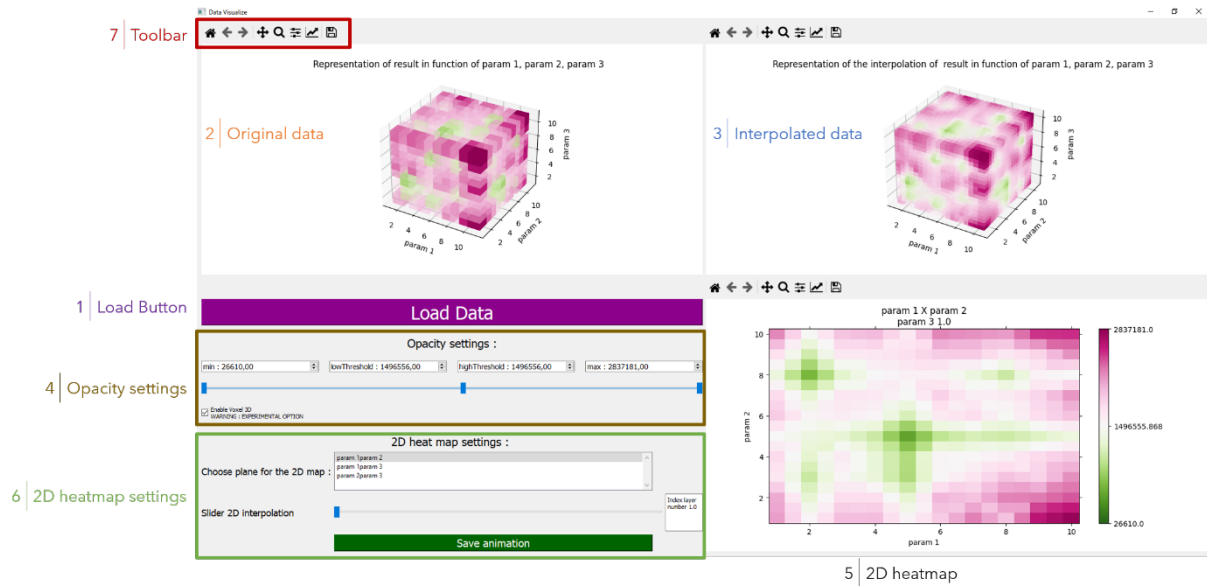To export figure to gif or mp4, program requires **ImageMagickDisplay** encoder.

https://imagemagick.org/script/download.php

To launch and modify Python program more easily, for instance Pyzo IDE could be used. However, all IDE could be used.

https://pyzo.org/

General presentation

Main window

1. Load file

File supported

Software	Extension
Excel	.xlsx
CSV/TSV/notepad	.csv .tsv .txt

### Data organization requirements

This order must be respected, values can be repeat, but after the first 'part data'. Also, float values are accepted, but can generate unexpected errors if the difference between two incrementation is too low.

Values can be missing; the program runs while order is respected. For instance, the first axe can move to 4 to 6 passing 5 but it can't make 4 to 6 then 6 to 5, order is broken.

For points repeated, it is necessary these points exist in the first part data, else, program forgets these values. For repeated points, an arithmetic average is computed.

If in the 4th column they are value ranging from 0 to 1, excluded range, all values are multiplied by 100. It's a reason why float values are not recommended for this column too.
By default for the .tsv .csv .txt the delimiter for column is tabulation.

2. ORIGINAL DATA
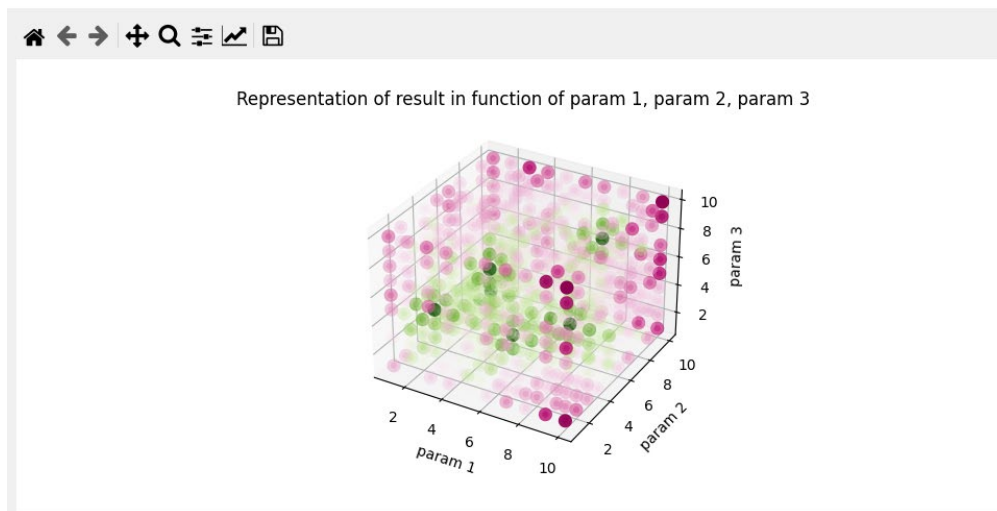
Data of the source file directly represented without any interpolation. Color is associated with the value of the 4th column of the source file, and opacity values are linear between the average and these extrema. Thus, by default, average isn't visible.

3. INTERPOLATED DATA
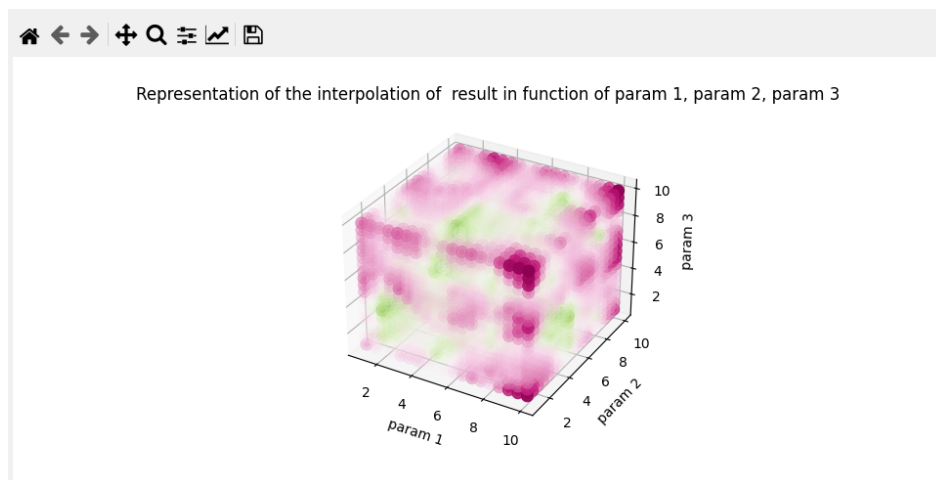
Source data are interpolated to create an overall figure. By default, the interpolation step is 0.5 for each axis, and for axis with a step inferior in the source data, the step for interpolation is changed to be the smallest. Interpolation setting is *linear* by default.

4. OPACITY SETTINGS
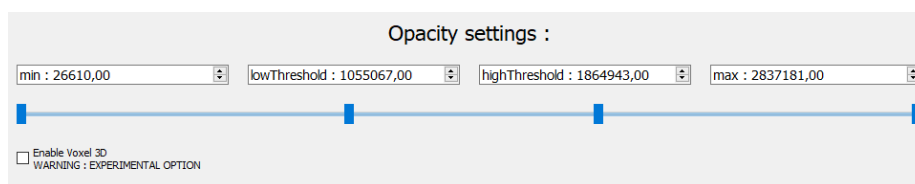
Opacity can be set up, where the minimum of opacity is at lowThreshold and at highThreshold, then increases of linear way, respectively until min and max value.
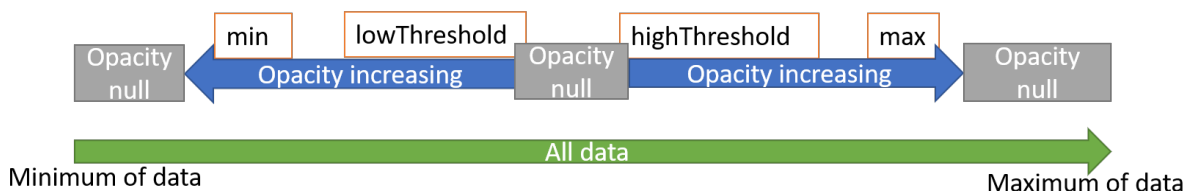
This setting can be made by the slider or with spinbox for a better accuracy. Values displayed are absolute values, not the normalize values.

By default, minimum and maximum are the same than the data; lowThreshold and highThreshold are set at the average value of data.

Voxel 3D is an experimental feature which transforms sphere to a cube, where opacity is also adjustable. But for some type of values the representation is irrelevant and asks a great performance for the computer, could cause crashes of the program.
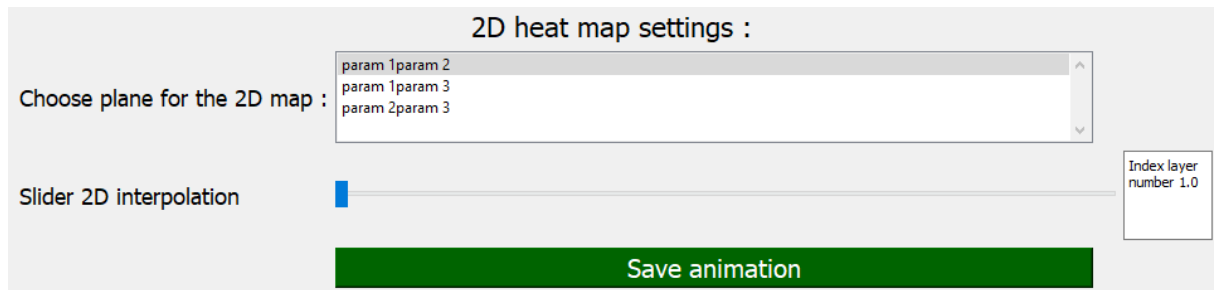
Tip:
Adjust your opacity with the normal plot, then, once settings finished, save picture with normal representation and after try with voxel mode.

5. 2D HEATMAP
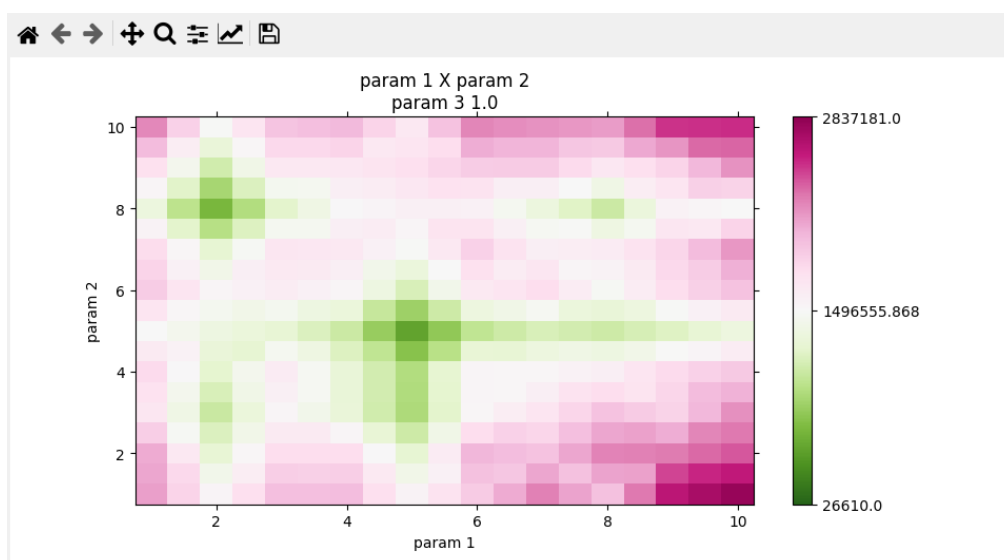
At a parameter constant, display a heat map. The extrema and the average are global extrema and average of data, not the local of the map. The 2D map uses data interpolated.

6. 2D HEATMAP SETTINGS

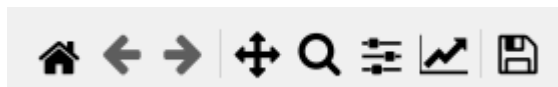Choose the plane wanted, and make unroll all layer, title of the figure and axis are automatically updated.

Save animation allows thanks *imagemagick* software to export the unroll for one plane in .gif or .mp4.

7. TOOLBAR

All figures have a matplotlib toolbar, allowing to set name for axis, for title, change the limit, save the figure in a picture, and many other options to custom your figure.

ADVANCED CUSTOMIZATION

Many options can be changed directly in the code of the program. These options are stored in a dictionary; thus, the syntax is 'name of the option': value or string assigned.

READFILEPARAMETER

Name of the option	Description	Default value
delimiter_csv	What type is the delimiter for .txt .csv .tsv files	'\t' (tabulation)
extension_supported	What are the extension displayed in the dialogue file	'*.xlsx *.csv *.tsv *.txt'
sheetExcelIndex	The index of the sheet where data are.	0

ANIMPARAMETERS

Name of the option	Description	Default value
interval	Time between 2 frames in ms.	1000
repeat	When animation is finished, i.e. all points are plotted, the animation is stopped.	False
Repeat_delay	Time between two animations	0
Fps	Frame per second for the record video	1
Writer	Software to encode the animation.	'imagemagick'

PLOTPARAMETERS

Name of the option	Description	Default value
colorMap	Type of the color decided. More information here : https://matplotlib.org/stable/tutorials/colors/colormaps.html	cm.PiYg_r
interpolation_method	Type of interpolation, avaible with Scipy. More information here: https://scipy.github.io/devdocs/reference/generated/scipy.interpolate.griddata.html#scipy.interpolate.griddata	linear

OTHER PARAMETERS

axisName : Define the default name of axis if nothing is found in the file. (x,y,z)

interpDefaultStep : Default step for the interpolation, but remember, the step is changed if a little step is found in the file. (0.5,0.5,0.5)

Voxel3D: Display by default voxel (False)