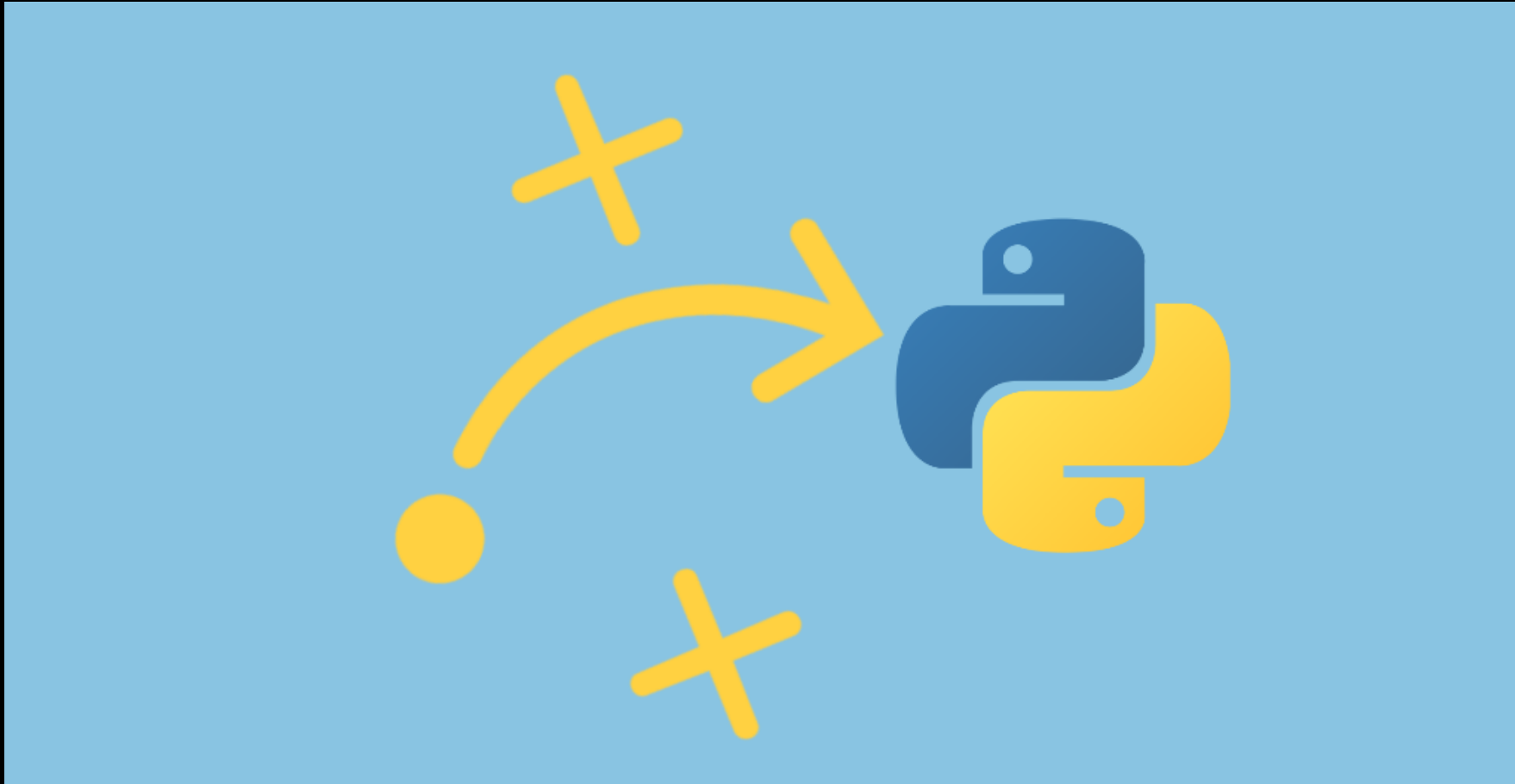


# Data science and Python



# Data science and Python

First pictures of a black hole

- numpy
- scipy
- pandas
- jupyter
- matplotlib
- astropy





# Jupyter Notebooks and JupyterLab

The screenshot displays the JupyterLab web interface in a browser window. The address bar shows `localhost:8888/lab`. The interface is divided into several panels:

- Left Panel (File Browser):** Shows a file tree with the following items:

Name	Last Modified
counting_domai...	3 minutes ago
<b>Lorenz.ipynb</b>	seconds ago
lorenz.py	9 days ago
requirements.txt	9 days ago
- Top Panel (Launcher):** Shows the current notebook `Lorenz.ipynb` and the selected kernel `Python 3`.
- Main Panel (Notebook):** Contains the following content:
  - Title:** The Lorenz Differential Equations
  - Text:** Before we start, we import some preliminary libraries. We will also import (below) the accompanying `lorenz.py` file, which contains the actual solver and plotting routine.
  - Code Cell [6]:**

```
%matplotlib inline
from ipywidgets import interactive, fixed
```
  - Text:** We explore the Lorenz system of differential equations:
  - Equations:**
$$\begin{aligned}\dot{x} &= \sigma(y - x) \\ \dot{y} &= \rho x - y - xz \\ \dot{z} &= -\beta z + xy\end{aligned}$$
  - Text:** Let's change  $(\sigma, \beta, \rho)$  with ipywidgets and examine the trajectories.
  - Code Cell [7]:**

```
from lorenz import solve_lorenz
w=interactive(solve_lorenz,sigma=(0.0,50.0),rho=(0.0,50.0))
w
```
  - Interactive Widgets:** Three sliders for parameters:
    - sigma: 3.30
    - beta: 1.63
    - rho: 36.20
  - Figure:** A plot showing the Lorenz attractor, a complex, chaotic trajectory in 3D space.
- Bottom Panel (Status Bar):** Shows `0` files, `2` kernels, `Python 3 | Idle`, `Mode: Command`, and `Ln 1, Col 1 Lorenz.ipynb`.

# demo

- Do domain counting demo