SPH3U07C - Mathématiques - Travaux Pratiques

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1 Course content

This is the english version of the TP for the course SPH3U07C - Mathématiques - Licence Physique at AMU. The official page and the course materials in french are here https://ametice.univ-amu.fr/course/view.php?id=116139. This laboratory will be focused on using Python to solve simple numerical problems and will last 6 hours (divided in 3 classes of 2 hours). The topics are indicatively the following:

1. **TP** (2 hours)
   - Welcome and instructions
   - Introduction to Python (basic concepts)
   - Computer arithmetic and sources of error
2. **TP** (2 hours)
   - The module `numpy` and basic operations (slicing, products, additions, trasposition)
   - Eigenvalues using power iteration method
   - Determinant of a matrix using the Leibniz formula
   - Inverse of a matrix with the adjugate formula
3. **TP** (2 hours)
   - Gauss-Jordan elimination method
   - Solving a system of linear equations
   - Computing determinant and inverse with the Gauss method

2 Google Colab

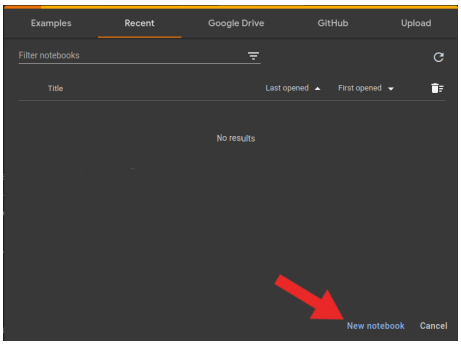
To use Python for scientific calculations you have two options.

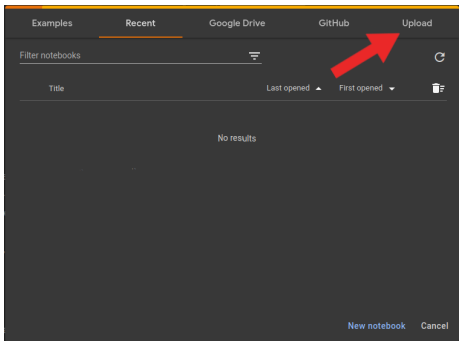
1 Install Python, Numpy, and Jupyterlab on your machine and execute the notebooks locally.

2 Use a Cloud platform. The main (free) options are Github Codespaces or `Google Colab`.

Having Python installed in your machine is optimal. However if you are a beginner I suggest to use `Google Colab`. To start using the `Google Colab` platform

1. Go to http://colab.research.google.com/ and login with a Google account
2. In the welcome screen create a new notebook and start coding or upload an existing one





3. In the colab notebook you have two kinds of cells:

   - **Text Cells** where you can write notes. If you want, you can enhance them using Markdown sintax, and they support basic LaTeX commands.
   - **Code Cells** where you can write Python code. To execute a code cell, you can click on the Play button at the left of the cell or press SHIFT+ENTER.

> Please *upload* the Introductory notebook and play with it to start familiarizing yourself with the platform.