Cours de Calcul Scientifique – Python3   M2 - Théorique

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Plan du Cours

0- Introduction

1- Install python compiler : Links for installing compilers

2- Introduction to Python : variables, lists, arrays, conditions, loops, functions, plotting, read/write to files

3- Differential Equations : Euler , RK2

4- Integration

5 - Fitting

0- Introduction

In this course we will learn how to solve physical problems using numerical methods and codes. We will learn how to write algorithms and programs using a programming langage as python.

We will have 2 parts : numerical methods and coding. We will work on both parts in parallel. For each numerical method, we will study the mathematical model, write the algorithm and transform it to a python code.

$$\textit{Numerical method} \rightarrow \textit{model} \rightarrow \textit{algorithm} \rightarrow \textit{code}$$

In the chapter 0, we will learn how to install Python interpreter on the laptop or on the smartphone. The aim is to compile programs and get results.

In chapter 1 , we will learn the most important commands on python and how to write programs.

In chapter 2, we will learn how to solve differential equations, with examples from physical phenomena

In chapter 3, we will learn integration and in chapter 4 we will learn how to fit data.

You can improve your level on python by following courses on youtube on different platforms, in English or in Arabic. But you don't need to learn everything about python, just the useful commands for your codes.

Here are some useful link

دروس بايثون خفيفة shorturl.at/abfEZ

المرجع الشامل إلى تعلم لغة بايثون shorturl.at/wCQ68

https://www.python.org/about/gettingstarted/

https://www.learnpython.org/

https://docs.python-guide.org/intro/learning/

Chapitre 0 : Installing Python Compiler

We will need a program to compile the codes, you can install a compiler on your laptop or smartphone, or use an online compiler if you have a good internet.

- We can install anaconda and use jupyter notebook, where we will compile programs on the browser. Here are the links to very interesting and easy video to learn how to install them

https://www.youtube.com/watch?v=9V2IvJWZJ3I
https://www.youtube.com/watch?v=0nrjHslIvT4

- There are also compliers for smartphone, as Pydroid 3 - IDE for Python 3
You will find it in the google play store. Here is a short video for the first use of this application

https://www.youtube.com/watch?v=Hu4jqz-sI5E

- We can use online compiler **https://repl.it/languages/python3**

Once you have installed your Python interpreter, we will write our first code. You should write the command and run it, this will execute the programm and print the sentence between ' '

print ('Hello World !')

Let's make another test

print ('Hello from Msila')

Those examples are very simple, since the commands are just printing what is between ' '.