

# MatDeck and Python Comparison

In this document we compare MatDeck and Python in several different situations and application scenarios. Two approaches are compared in terms in possibilities, complexity and ease of use, amount of code needed, and speed of execution.

## Data Visualization and Plotting

### Comparison between MatDeck Graph and Python Graph

The main advantage of MatDeck graph compared to Python graph, is in the fact that the graph properties are easy set using directly graph GUI, while Python graph is configured by using script code. Please check an example `py_med2`

We have also to point out, that MatDeck graph is included by the most MatDeck licenses, there is no need for additional installation of any package. In the Python `matplotlib` library is used. Therefore, it is necessary to install `matplotlib`, which can be done using the following command `python -m pip install -U matplotlib`. `matplotlib` is available for Windows.

### Multiple Graphs

In Matdeck, it is possible to group several graphs into the same canvas. It is also possible to add several plots to the same graph using different colors. The main advantage of MatDeck graph compared to Python graph, is in the fact that the graph properties are easy set using directly graph GUI, while Python graph is configured by using script code.

Python offers three different ways to display two plots simultaneously. The first option is to plot two lines in separate plots. The second option is to plot two lines in the single plot. The third options is to use subplots. However, it is required to use many lines of code, and it requires medium and advanced coding knowledge.

### FFT Algorithm

The speed of `fft` function is very important in many applications. The MatDeck function `fft1` has speed which is comparable with other functions in many applications for every possible length of the input vector. Especially, if `fft1` function is evaluated using `Build and Run Exe` option.

In Python, `fft` function is part of `scipy` library. Therefore, it is necessary to install `scipy`, which can be done using the following command `python -m pip install -U scipy`. Furthermore, the `fft` function has extremely long execution time if the length input vector is large primer number. For example, if the length of the input vector is 100003, the execution time will be more than 30 seconds.