

Python Programs to Visualize Results - Multiple Graphs

- Level: Medium

Given four arrays `vec1` and `vec2`, `vec3` and `vec4`. The task is to write a Python program to visualize the result, by plotting two line graphs using `vec1` as x axis and `vec2` as y axis, and `vec3` as x axis and `vec4` as y axis in the second graph.

Examples:

```
Input1: vec1 = [1, 2, 3, 4, 5] vec2 = [10, 12, 9, 11, 13]
```

```
Input2: vec3 = [0, 1, 2, 3, 4] vec4 = [8, 10, 7, 9, 11]
```

```
Output: Various sorts of multiple 2D graph - line plots
```

Four vectors are defined in MatDeck script:

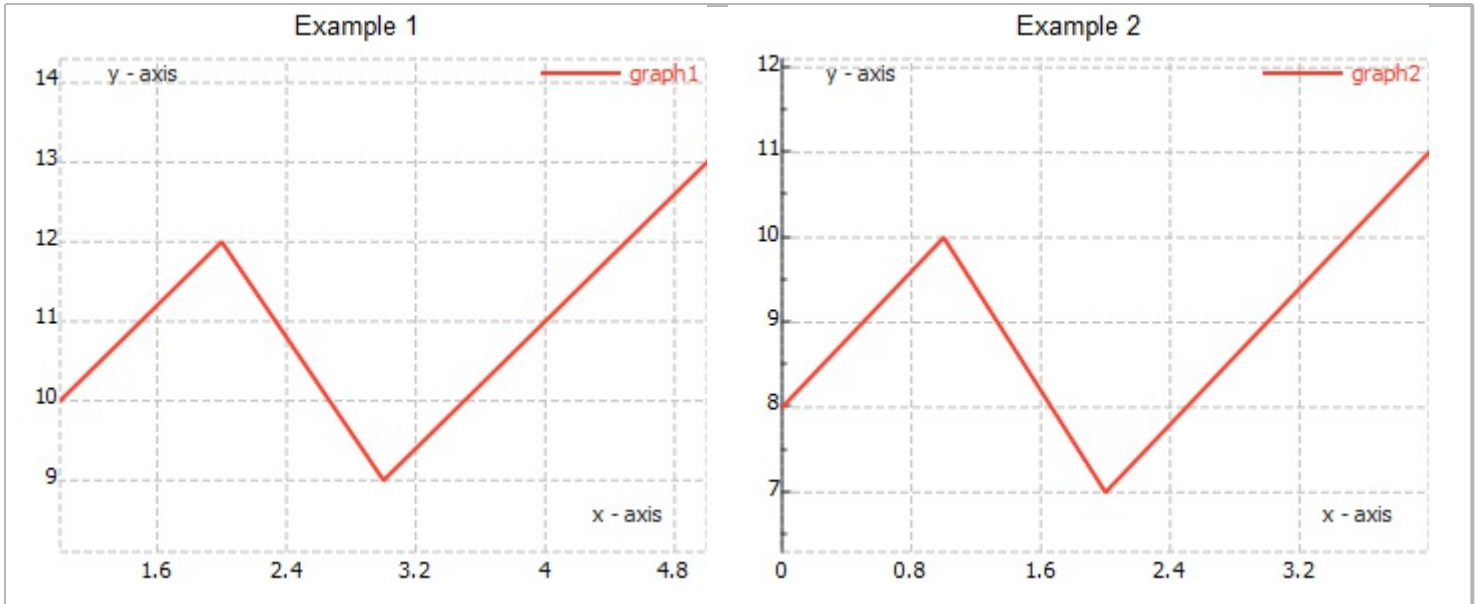
```
1 vec1 := [1, 2, 3, 4, 5]
2 vec2 := [10, 12, 9, 11, 13]
3 vec3 := [0, 1, 2, 3, 4]
4 vec4 := [8, 10, 7, 9, 11]
```

MatDeck Script Code

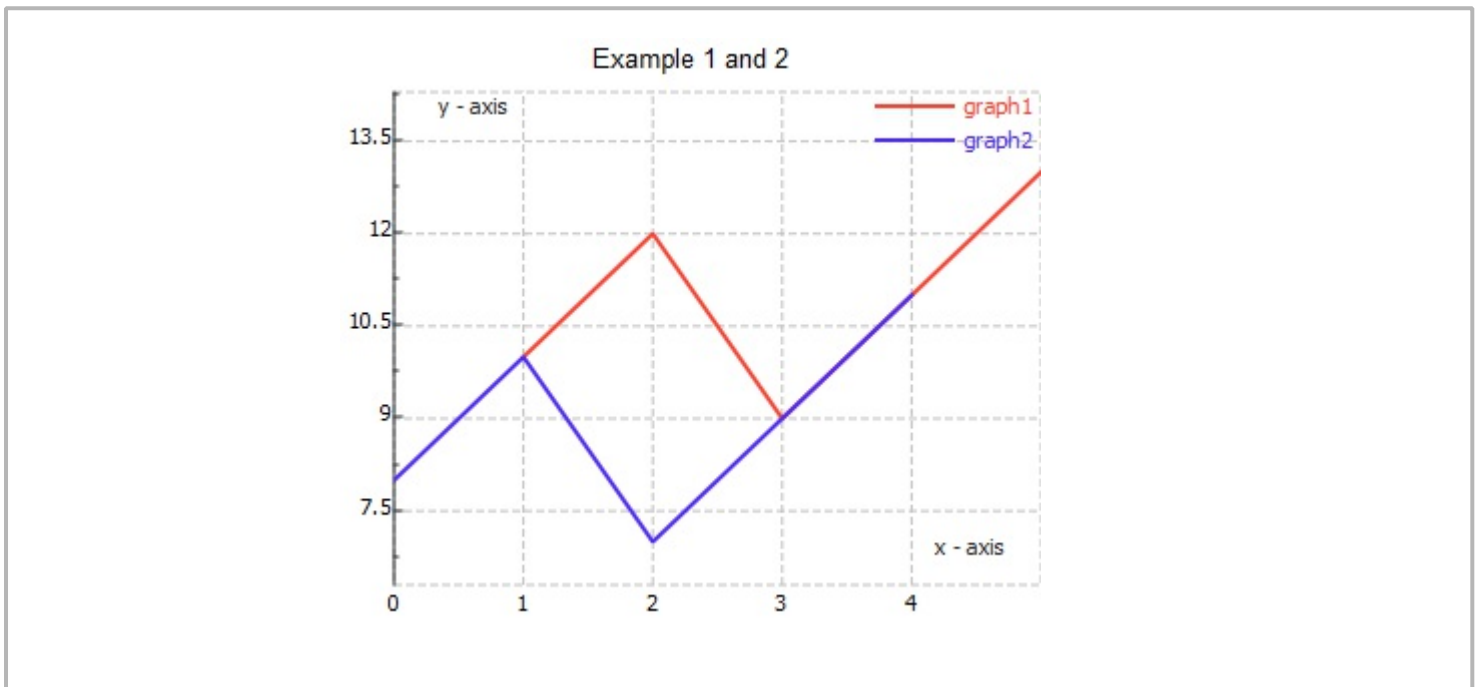
Here, we illustrate the same process in MatDeck Script. The use of 2D graph is supported by the most MatDeck licenses, there is no need for additional installation of any package. Further, the code is rather simple and graph can be embedded within Matdeck document. The main advantage of MatDeck graph 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. The first step is to define variables which will be displayed in 2D Graph.

```
5 graph1 := join_mat_rows(vec1, vec2)
6 graph2 := join_mat_rows(vec3, vec4)
7
```

The first way to display these two graphs is to use separate 2D graph for each.



The second option is to use single 2D graph and two plots within it.



Python Code

In the program below, the Python library matplotlib 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.

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.

```
8 #py
9 #The first option, two figures with single line graph
10 import matplotlib.pyplot as plt
11 plot1 = plt.figure(1)
12 plt.plot(vec1,vec2,color='red',lw=1)
13 plt.xlabel('x - axis')
14 plt.ylabel('y - axis')
15 plt.title('Example 1')
16 plt.grid()
17 plot2 = plt.figure(2)
18 plt.plot(vec3,vec4,color='red',lw=1)
19 plt.xlabel('x - axis')
20 plt.ylabel('y - axis')
21 plt.title('Example 2')
22 plt.grid()
23
24 #The second option, two lines in the same figure
25 plot3 = plt.figure(3)
26 plt.plot(vec1,vec2,color='red',lw=1)
27 plt.plot(vec3,vec4,color='blue',lw=1)
28 plt.xlabel('x - axis')
29 plt.ylabel('y - axis')
30 plt.title('Example 1 and 2')
31 plt.grid()
32
33 #The third option, subplots in the same figure
34 plot4=plt.figure(4)
35 plt.subplot(211)
36 plt.plot(vec1,vec2,color='red',lw=1)
37 plt.xlabel('x - axis')
38 plt.ylabel('y - axis')
39 plt.title('Example 1 and 2')
40 plt.grid()
41 plt.subplot(212)
42 plt.plot(vec3,vec4,color='red',lw=1)
43 plt.xlabel('x - axis')
44 plt.ylabel('y - axis')
45 plt.grid()
46
47 plt.show()
48 ###
49
```