my Tests with ipywidgets

The notebook give step-by-step example on how to use the ipywidgets FloatSilder and Play for your matplotlib diagrams to allow some user interactions.

- Examples: ipywidgets @ read the docs - examples >> interact()
- Installtion: ipywidgets @ read the docs - Installation

imports

You need an inline statement and some python libraries to import:

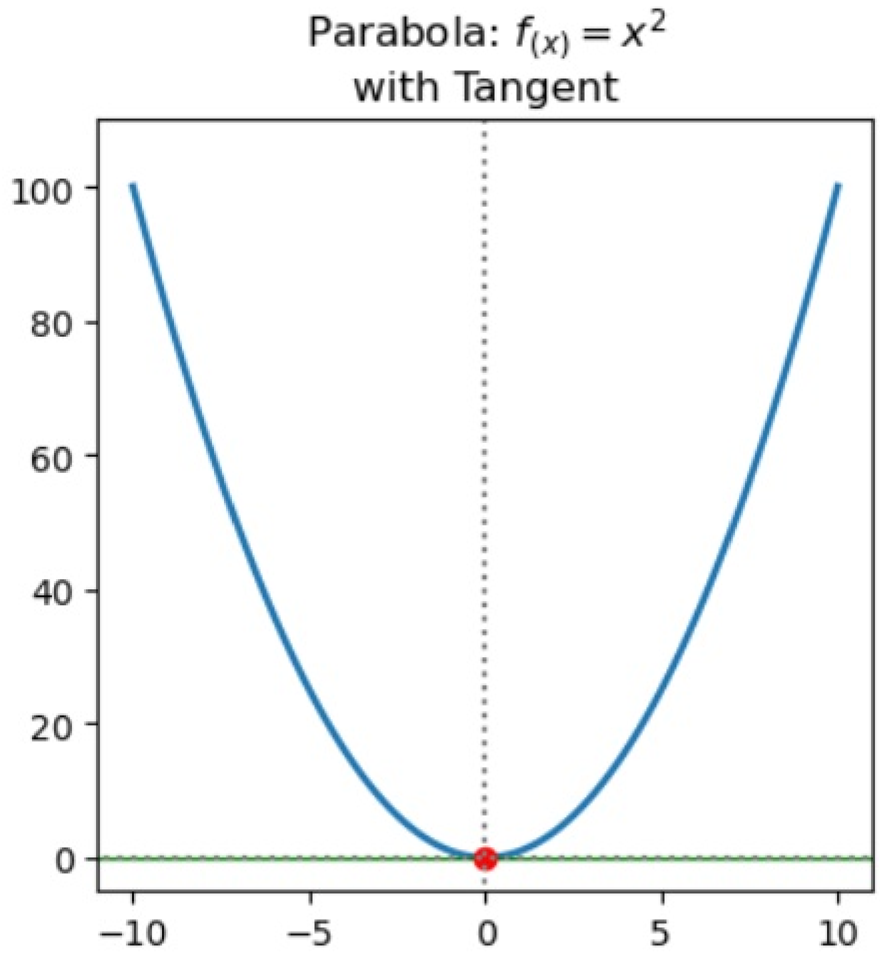
```
%matplotlib inline

import matplotlib.pyplot as plt
import ipywidgets as widgets
from IPython.display import display
from matplotlib.lines import Line2D
```

The diagram as a function by matplotlib figure

Approach to make your diagram / figure by a fuction: 1. initallay just code you matplotlib based diagram / figure 2. indent that block 3. before 1st line: make a def fuction(parameters): line 4. add a return; the return(plt.show()

you will get somthing like

```
def show_diagram(pt_x=0):
    # the figure, axes
    fig = plt.figure(figsize=(4,4))
    ax = fig.add_subplot(111)
    ...
    ...
    ...
    # show the diagram
    return(fig.show())

show_diagramm(0)
```



FloatSlider

With the `FloatSlider` you can manipulate the parameter for displaying your figure.

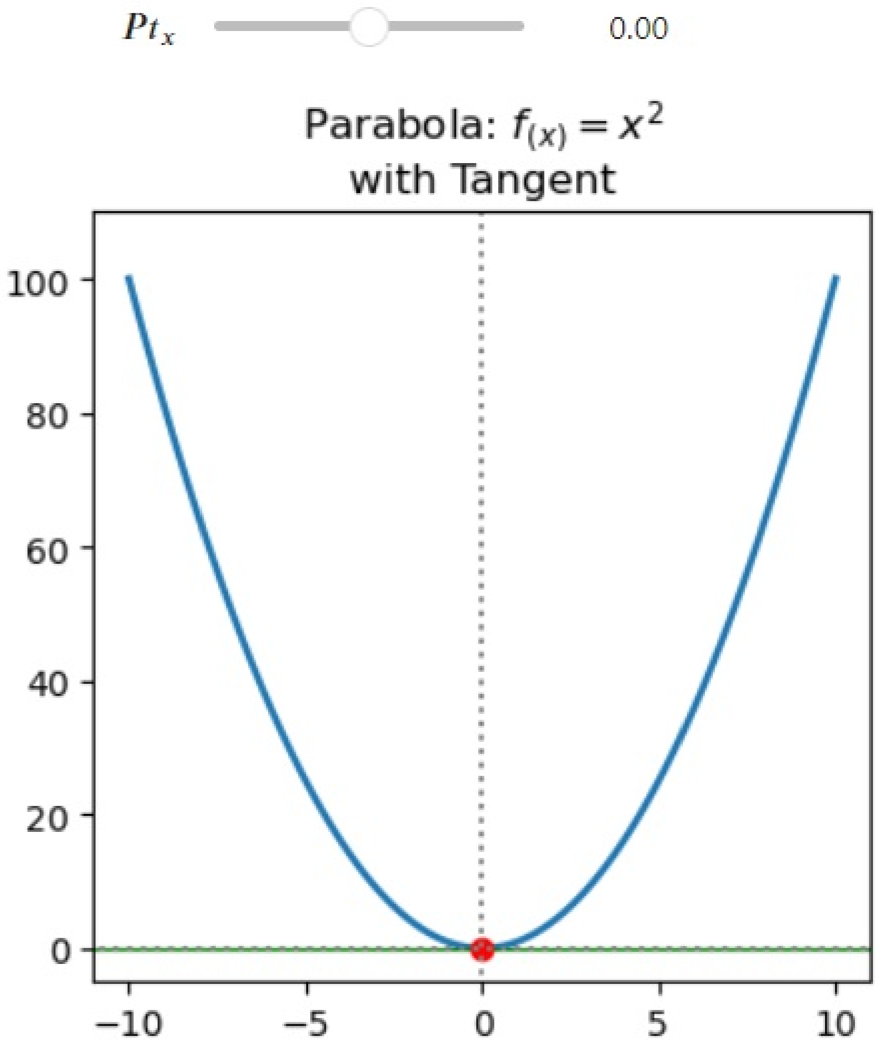
Use `widget.interact(<function_name>, <variable> = (min, max))`

e.g.:

```
widget.interact(show_diagram, pt_x = (-10, 10));
```

or with some more details

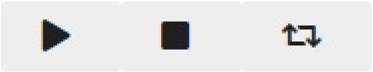
```
widgets.interact(show_diagram,
                 pt_x=widgets.FloatSlider(min=-10,
                                          max=10,
                                          step=0.25,
                                          value=0,
                                          description='$Pt_{x}$',
                                          continuous_update=True));
```

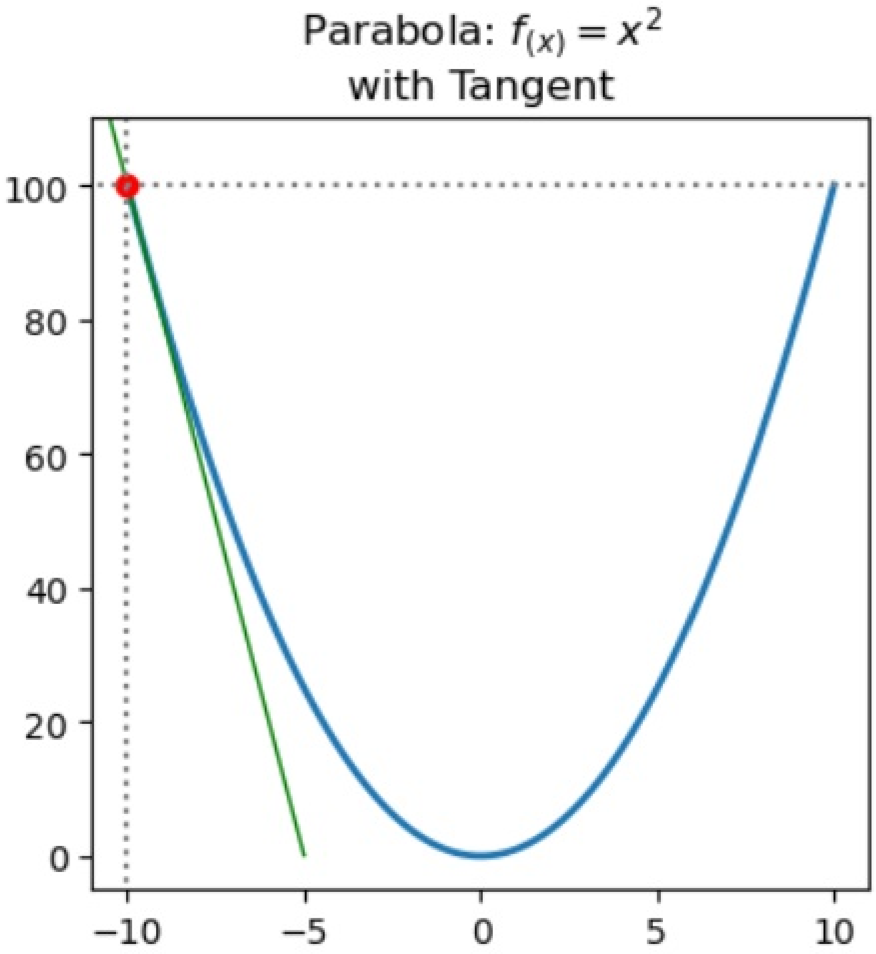


Play

With Play you start the the generation and dsiplay of your diagrams from min to max given parameter, figure sequence.

```
widgets.interact(show_diagram, pt_x=widgets.Play(value=-10,
                                                 min=-10,
                                                 max=10,
                                                 # step minimum == 1 (int only)
                                                 step=1,
                                                 # time betwenn steps in millis
                                                 interval=250,
                                                 description="Press play",
                                                 disabled=False # to enable the
                                                ));
```





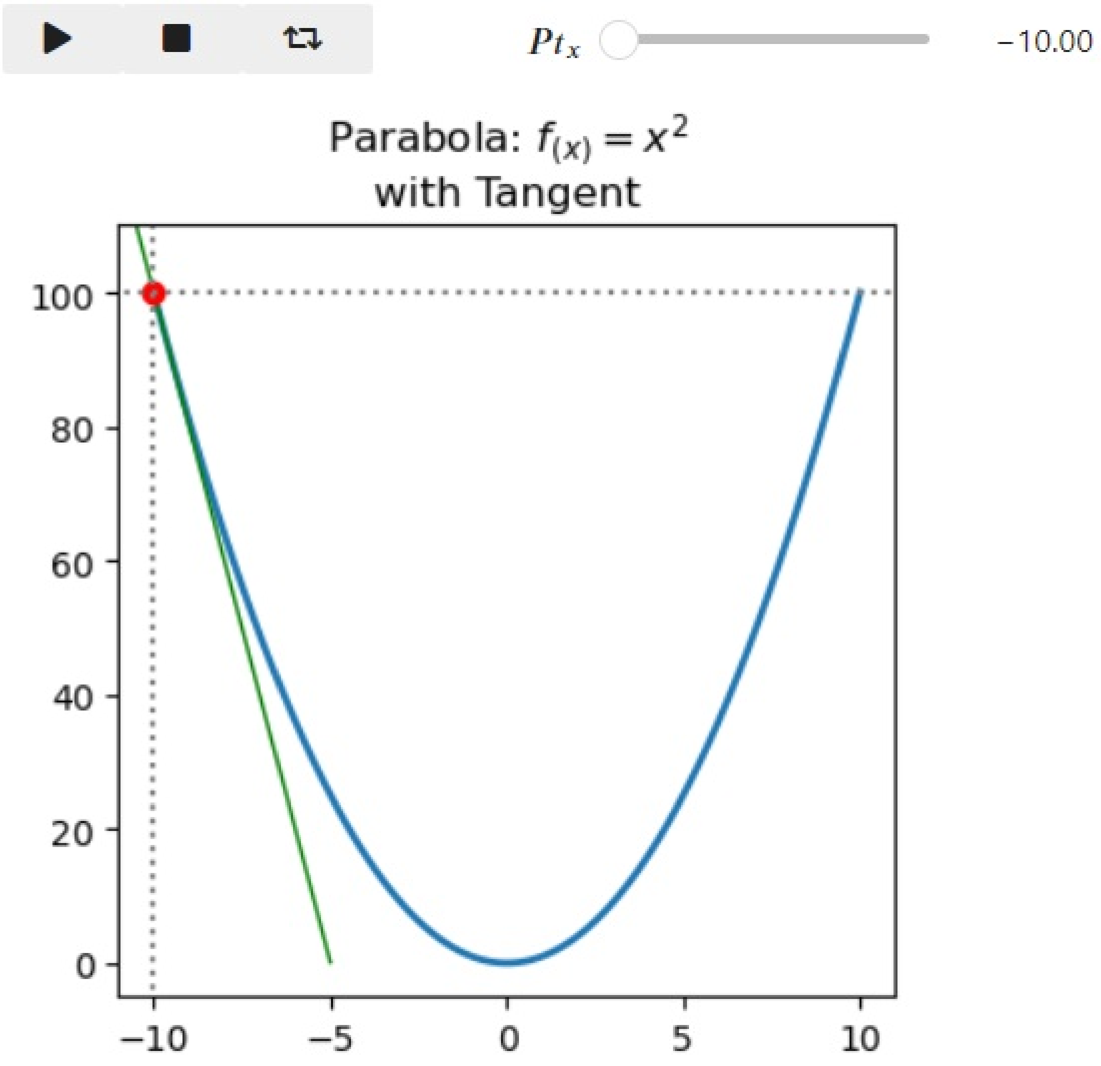
Together `Play` and `FloatSlider`

Interact with both widgets jslinked

1. to play the sequence, or
2. stop it any time and manipulate by mouse

```
play = widgets.Play(value=-10,
                    min=-10,
                    max=10,
                    step=1,         # step minimum == 1 (integers only)
                    interval=250,   # time between steps in millisec
                    description="Press play",
                    disabled=False) # to enable the widget

fslider = widgets.FloatSlider(min=-10,
                              max=10,
                              step=0.25,
                              value=0,
                              description='$Pt_{x}$',
                              continuous_update=True)
```

```
widgets.jslink((play, 'value'), (fslider, 'value')) # the jslink
ui = widgets.HBox([play, fslider]) # to display them apart horizontally

def f(play, fslider):
    # as widgets are jslink_ed we only need one of them
    show_diagram(play)

out = widgets.interactive_output(f, {'play': play, 'fslider': fslider})

display(ui, out) # the output
```


Pt_x
−10.00
Parabola: $f_{(x)} = x^2$
with Tangent
100
80
60
40
20
0
−10
−5
0
5
10