Jupyter notebook custom conversion

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Contents

```
COUNTER=0
```

1 nbconvert latex test

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc luctus bibendum felis dictum sodales. Ut suscipit, orci ut interdum imperdiet, purus ligula mollis *justo*, non malesuada nisl augue eget lorem. Donec bibendum, erat sit amet porttitor aliquam, urna lorem ornare libero, in vehicula diam diam ut ante. Nam non urna rhoncus, accumsan elit sit amet, mollis tellus. Vestibulum nec tellus metus. Vestibulum tempor, ligula et vehicula rhoncus, sapien turpis faucibus lorem, id dapibus turpis mauris ac orci. Sed volutpat vestibulum venenatis.

This is a test list:

1. item 1
    - subitem 1
    - subitem 2
2. item 2
3. item 3

2 Printing using python

```
next_paragraph = """
Aenean vitae diam consectetur, tempus arcu quis, ultricies urna. Vivamus
 ↪  venenatis sem
quis orci condimentum, sed feugiat dui porta.
"""

def identity_dec(ob):
    return ob

@identity_dec
def nifty_print(text):
    """Used to test syntax highlighting"""

    print(text * 2)

nifty_print(next_paragraph)
```

```
Aenean vitae diam consectetur, tempus arcu quis, ultricies urna. Vivamus
venenatis sem
quis orci condimentum, sed feugiat dui porta.

Aenean vitae diam consectetur, tempus arcu quis, ultricies urna. Vivamus
venenatis sem
quis orci condimentum, sed feugiat dui porta.
```

3 Pyout (and Text Wrapping)

```
Text = """
Aliquam blandit aliquet enim, eget scelerisque eros adipiscing quis. Nunc sed
 ↪  metus
ut lorem condimentum condimentum nec id enim. Sed malesuada cursus hendrerit.
 ↪  Praesent
et commodo justo. Interdum et malesuada fames ac ante ipsum primis in
 ↪  faucibus.
Curabitur et magna ante. Proin luctus tellus sit amet egestas laoreet. Sed
 ↪  dapibus
neque ac nulla mollis cursus. Fusce mollis egestas libero mattis facilisis.
"""
Text #Use print(Text) instead to get text wrapping in pdf
```

```
'\nAliquam blandit aliquet enim, eget scelerisque eros adipiscing quis. Nunc
sed metus \nut lorem condimentum condimentum nec id enim. Sed malesuada
cursus hendrerit. Praesent \net commodo justo. Interdum et malesuada fames ac
ante ipsum primis in faucibus. \nCurabitur et magna ante. Proin luctus tellus
sit amet egestas laoreet. Sed dapibus \nneque ac nulla mollis cursus. Fusce
mollis egestas libero mattis facilisis.\n'
```

```
print(Text)
```

```
Aliquam blandit aliquet enim, eget scelerisque eros adipiscing quis. Nunc sed
metus
ut lorem condimentum condimentum nec id enim. Sed malesuada cursus hendrerit.
Praesent
et commodo justo. Interdum et malesuada fames ac ante ipsum primis in
faucibus.
Curabitur et magna ante. Proin luctus tellus sit amet egestas laoreet. Sed
dapibus
neque ac nulla mollis cursus. Fusce mollis egestas libero mattis facilisis.
```

```
import numpy as np

a = np.random.rand(10,10)
print(a)
a
```

```
[[0.16298113 0.29238972 0.60688675 0.48054093 0.94893011 0.54674309
  0.79359372 0.95806852 0.06459257 0.53719962]
 [0.53510871 0.75301885 0.90595976 0.40742258 0.32468072 0.63071862
  0.47513785 0.00246886 0.75382423 0.87461344]
 [0.32641994 0.23878221 0.61858183 0.40509387 0.05656326 0.38832618
  0.30242037 0.60241682 0.39938876 0.44259181]
 [0.02365565 0.89266651 0.76113028 0.14285784 0.83871933 0.50877496
  0.16702902 0.6714255  0.72570507 0.5286317 ]
 [0.15864989 0.4209803  0.90995404 0.48337292 0.27258449 0.03598368
  0.92775021 0.97266405 0.49118032 0.32383071]
 [0.52825824 0.98466964 0.23750965 0.03561446 0.26444503 0.15874633
  0.75189063 0.02797516 0.49040284 0.8126103 ]
 [0.13081621 0.23197935 0.33303489 0.20345976 0.16445904 0.02365378
  0.70158795 0.89111642 0.79903487 0.22216514]
 [0.97189076 0.20769    0.18102629 0.34333842 0.38574186 0.10887753
  0.18182553 0.70195745 0.08618781 0.92448642]
 [0.69612045 0.56082515 0.47905892 0.51181756 0.09073182 0.35267001
  0.49347121 0.29926939 0.97788754 0.91713826]
 [0.60367851 0.4284466  0.84342832 0.39536524 0.26396413 0.27961796
  0.97011029 0.61931104 0.42502391 0.19332462]]
```

```
array([[0.16298113, 0.29238972, 0.60688675, 0.48054093, 0.94893011,
        0.54674309, 0.79359372, 0.95806852, 0.06459257, 0.53719962],
       [0.53510871, 0.75301885, 0.90595976, 0.40742258, 0.32468072,
        0.63071862, 0.47513785, 0.00246886, 0.75382423, 0.87461344],
       [0.32641994, 0.23878221, 0.61858183, 0.40509387, 0.05656326,
        0.38832618, 0.30242037, 0.60241682, 0.39938876, 0.44259181],
       [0.02365565, 0.89266651, 0.76113028, 0.14285784, 0.83871933,
        0.50877496, 0.16702902, 0.6714255 , 0.72570507, 0.5286317 ],
       [0.15864989, 0.4209803 , 0.90995404, 0.48337292, 0.27258449,
        0.03598368, 0.92775021, 0.97266405, 0.49118032, 0.32383071],
       [0.52825824, 0.98466964, 0.23750965, 0.03561446, 0.26444503,
        0.15874633, 0.75189063, 0.02797516, 0.49040284, 0.8126103 ],
       [0.13081621, 0.23197935, 0.33303489, 0.20345976, 0.16445904,
```

```
 0.02365378, 0.70158795, 0.89111642, 0.79903487, 0.22216514],
[0.97189076, 0.20769   , 0.18102629, 0.34333842, 0.38574186,
 0.10887753, 0.18182553, 0.70195745, 0.08618781, 0.92448642],
[0.69612045, 0.56082515, 0.47905892, 0.51181756, 0.09073182,
 0.35267001, 0.49347121, 0.29926939, 0.97788754, 0.91713826],
[0.60367851, 0.4284466 , 0.84342832, 0.39536524, 0.26396413,
 0.27961796, 0.97011029, 0.61931104, 0.42502391, 0.19332462]])
```

4 Image and plots

4.1 As plain text using markdown

Once exported as markdown and converted to latex/pdf with pandoc, the `{width=60%}` will fix the width of the picture and the `My legend` will appear as caption:

```
![My legend](figures/magnetostatics_field.png){width=50% #figlabel}
```

gives the result showns in this figure.

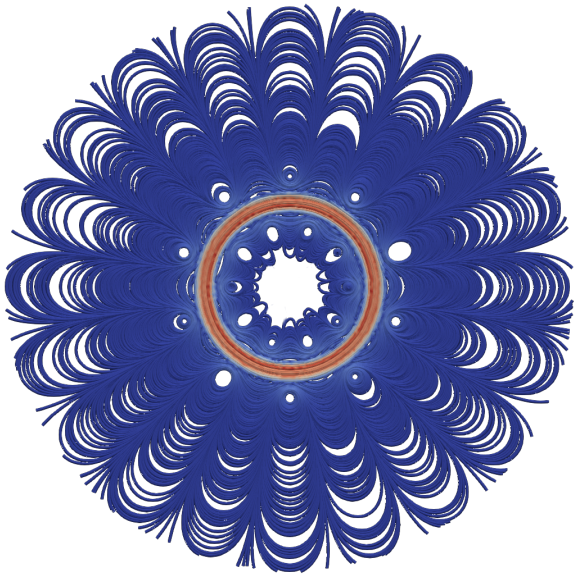

Figure 1: My legend

```
from IPython.core.display import Image
Image(data="http://ipython.org/_static/IPy_header.png")
```

Figure 2: png

4.2 Plots produced by the code

```
#%matplotlib inline
import matplotlib.pyplot as plt
import numpy as np

x = np.linspace(-10,10,300)
y = np.sin(x)
plt.figure(figsize=(4,3),dpi=100)
p=plt.plot(x,y)
```

```
%matplotlib notebook
plt.ioff()
from IPython.display import Markdown

def plt2md(figlabel,figcaption,figsize):
    global COUNTER
    figname = figlabel+'_'+str(COUNTER)+'.png'
    plt.tight_layout()
    plt.savefig(figname)
    plt.savefig(figlabel+'.pdf')
    strMD='![{}]({})'.format(figcaption,figname) +\
        '{' + 'width={} #'.format(figsize) + figlabel + '}'
    COUNTER+=1
    return display(Markdown(strMD))
Markdown('---')
```

```
plt.figure(figsize=(8,3),dpi=150)
plt.plot(x,y)
plt.xlabel('$X_{e}$ [SI]')
plt.ylabel('$Y_{UPDATE12}$ [SI]')
```

```
plt2md('myplot','This is a test of how to get proper'+\
       'plot from Jupyter notebook in MD,'+\
       'to be processed using PANDOC','100%')
Markdown('---')
```

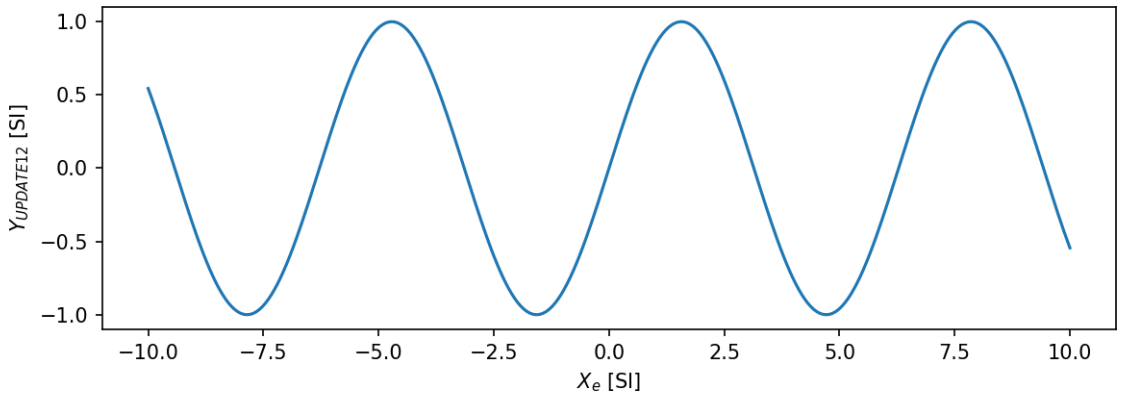

Figure 3: This is a test of how to get properplot from Jupyter notebook in MD,to be processed using PANDOC

We can then refer to a given figure using cross-references like this, obtained with:

```
[like this](#myplot)
```

```
plt.figure(figsize=(4,3),dpi=150)
plt.plot(np.sqrt(np.abs(x)),y**2)
plt.xlabel('$X_{e}$ [SI]')
plt.ylabel('$Y_{OTHER}$ [SI]')
plt2md('myplot2','This is another test of how to get proper'+\
       'plot from Jupyter notebook in MD,'+\
       'to be processed using PANDOC','50%')

display(Markdown('---'))
```

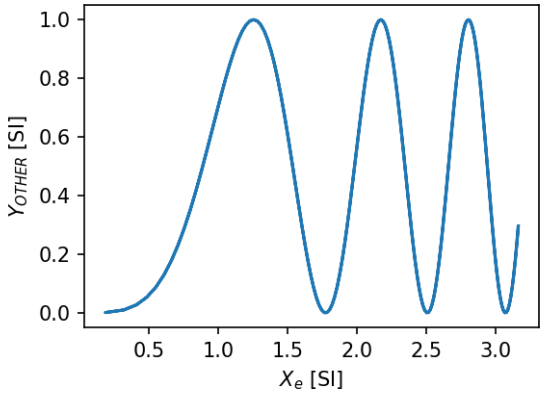

Figure 4: This is another test of how to get properplot from Jupyter notebook in MD,to be processed using PANDOC

```
plt.plot(x**2,y)
plt2md('myplot3','Adding more plot without re-creating a figure: curves
 ↪  cumulates','50%')
Markdown('---')
```

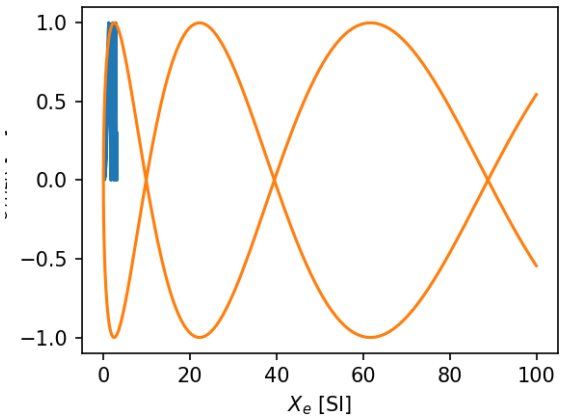

Figure 5: Adding more plot without re-creating a figure: curves cumulates

---

```
plt.figure(figsize=(4,3),dpi=150)
plt.plot(x**2,y)
```

```
plt2md('myplot4','More plot with re-creating a figure: only last
 ↪  curve','50%')
Markdown('---')
```

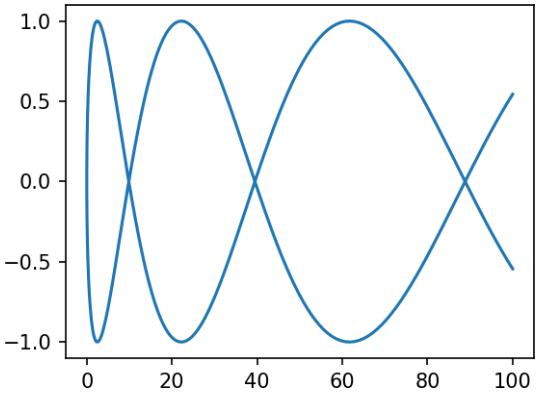

Figure 6: More plot with re-creating a figure: only last curve

---

5 Operator Highlighing Check

```
#This is a comment with an operation x @ y in it.
test = 5**9 + 2 - x@ y / (7 % 2) + True * 7
print(test)

a = set([1,2,3,4,5,6,7,8,9,0])
b = set([2,4,6,8,0])
a & b
```

```
1952904.9236703357
```

$$\{0, 2, 4, 6, 8\}$$

6 Tables

6.1 Markdown as plain text

First a *markdown* table:

Column 1	Column 2
1	3
~~a~~	b
4	&

6.2 Pandas as default and Markdown

```
import pandas as pd
df=pd.DataFrame(np.random.randn(10,3))

def df2md(df):
    from IPython.display import Markdown
    from tabulate import tabulate
    return display(Markdown( tabulate(df, headers='keys', tablefmt='pipe') ))
```

```
# Default printing is HTML, so it looks good
# on the web but it is not well
# rendered in pdf via ipynb->MB->pdf (using nbconvert
# and pandoc)
df
```

0

1

2

0

1.705797

-0.246615

-0.831035

1

-0.049958

0.769684

-1.064141

2

0.533581

0.233747

0.109178

3

-0.004270

-1.729752

-0.026460

4

0.256298

0.836856

0.767965

5

-0.573223

-1.082970

-1.162997

6

0.313842

0.656127

-0.190213

7

0.757791

-0.069110

-0.729063

8

0.705909

-1.114225

-0.083281

9

-0.843936

-0.561475

-0.675126

```
# Markdown printing well rendered
# in MD using nbconvert
df2md(df)
```

	0	1	2
0	1.7058	-0.246615	-0.831035
1	-0.0499584	0.769684	-1.06414
2	0.533581	0.233747	0.109178
3	-0.00426978	-1.72975	-0.0264595
4	0.256298	0.836856	0.767965
5	-0.573223	-1.08297	-1.163
6	0.313842	0.656127	-0.190213
7	0.757791	-0.06911	-0.729063
8	0.705909	-1.11422	-0.0832815
9	-0.843936	-0.561475	-0.675126

7 Sympy output

```
import sympy
from sympy.abc import x, n, m
sympy.init_printing()
theta = sympy.Symbol('theta')
phi = sympy.Symbol('phi')

sympy.simplify(sympy.Ynm(n,m,theta,phi).expand(func=True))
```

$$\frac{\sqrt{\frac{(2n+1)\Gamma(-m+n+1)}{\Gamma(m+n+1)}}e^{im\phi}P_n^{(m)}(\cos(\theta))}{2\sqrt{\pi}}$$

x + y as plain text.

$\frac{P_n^{(m)}(\cos(\theta))}{2\sqrt{\pi}}\sqrt{\frac{(-m+n)!}{(m+n)!}(2n+1)}e^{im\phi}$

8 Line Length

```
1 3 5 7 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75
↪  78 81 84 87 90 93 96 99 103
```