ML10.ipynb - Colaboratory

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EM_Kmeans.ipynb | KNN.ipynb | ML10.ipynb

Code

Python (Pyodide)

[2]:
```
import numpy as np
from bokeh.plotting import figure, show, output_notebook
from bokeh.layouts import gridplot
from bokeh.io import push_notebook
output_notebook()
import numpy as np
```

BokehJS 2.4.3 successfully loaded.

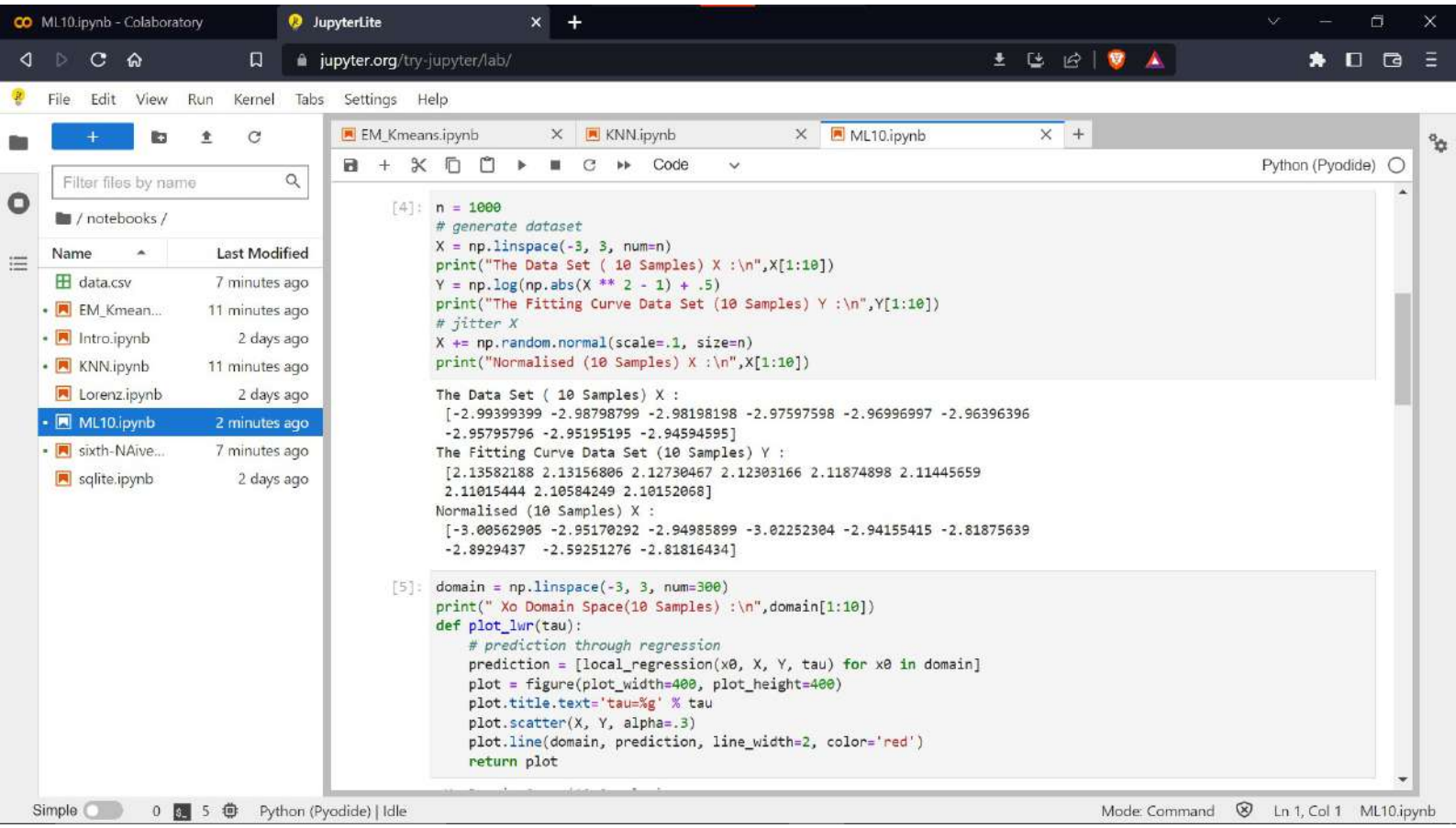
[3]:
```
def local_regression(x0, X, Y, tau):
    # add bias term
    x0 = np.r_[1, x0] # Add one to avoid the loss in information
    X = np.c_[np.ones(len(X)), X]

    # fit model: normal equations with kernel
    xw = X.T * radial_kernel(x0, X, tau) # XTranspose * W
    beta = np.linalg.pinv(xw @ X) @ xw @ Y
    # @ Matrix Multiplication or Dot Product
    # predict value
    return x0 @beta # @ Matrix Multiplication or Dot Product for prediction
def radial_kernel(x0, X, tau):
    return np.exp(np.sum((X - x0) ** 2, axis=1) / (-2 * tau * tau))
# Weight or Radial Kernal Bias Function
```

[4]:
```
n = 1000
# generate dataset
X = np.linspace(-3, 3, num=n)
print("The Data Set ( 10 Samples) X :\n",X[1:10])
```

Simple 0 5 Python (Pyodide) | Idle

Mode: Command Ln 1, Col 1 ML10.ipynb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sixth-NAive... 7 minutes ago
sqlite.ipynb 2 days ago
EM_Kmeans.ipynb
KNN.ipynb
ML10.ipynb
Code
Python (Pyodide)
[4]:
n = 1000
# generate dataset
X = np.linspace(-3, 3, num=n)
print("The Data Set (10 Samples) X :\n",X[1:10])
Y = np.log(np.abs(X ** 2 - 1) + .5)
print("The Fitting Curve Data Set (10 Samples) Y :\n",Y[1:10])
# jitter X
X += np.random.normal(scale=.1, size=n)
print("Normalised (10 Samples) X :\n",X[1:10])
The Data Set (10 Samples) X :
[-2.99399399 -2.98798799 -2.98198198 -2.97597598 -2.96996997 -2.96396396
-2.95795796 -2.95195195 -2.94594595]
The Fitting Curve Data Set (10 Samples) Y :
[2.13582188 2.13156806 2.12730467 2.12303166 2.11874898 2.11445659
2.11015444 2.10584249 2.10152068]
Normalised (10 Samples) X :
[-3.00562905 -2.95170292 -2.94985899 -3.02252304 -2.94155415 -2.81875639
-2.8929437 -2.59251276 -2.81816434]
[5]:
domain = np.linspace(-3, 3, num=300)
print(" Xo Domain Space(10 Samples) :\n",domain[1:10])
def plot_lwr(tau):
# prediction through regression
prediction = [local_regression(x0, X, Y, tau) for x0 in domain]
plot = figure(plot_width=400, plot_height=400)
plot.title.text='tau=%g' % tau
plot.scatter(X, Y, alpha=.3)
plot.line(domain, prediction, line_width=2, color='red')
return plot
Simple 0 5 Python (Pyodide) | Idle
Mode: Command Ln 1, Col 1 ML10.ipynb

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EM_Kmeans.ipynb | KNN.ipynb | ML10.ipynb

Code

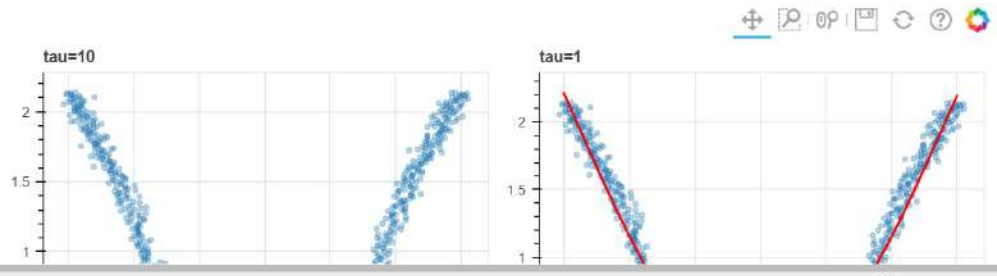
Python (Pyodide)

```
Xo Domain Space(10 Samples) :
[-2.97993311 -2.95986622 -2.93979933 -2.91973244 -2.89966555 -2.87959866
 -2.85953177 -2.83946488 -2.81939799]
```

[7]:

```
import numpy as np
from bokeh.plotting import figure, show, output_notebook
from bokeh.layouts import gridplot
from bokeh.io import push_notebook
output_notebook()
import numpy as np
# Plotting the curves with different tau
show(gridplot([
    [plot_lwr(10.), plot_lwr(1.)],
    [plot_lwr(0.1), plot_lwr(0.01)]
]))
```

BokehJS 2.4.3 successfully loaded.



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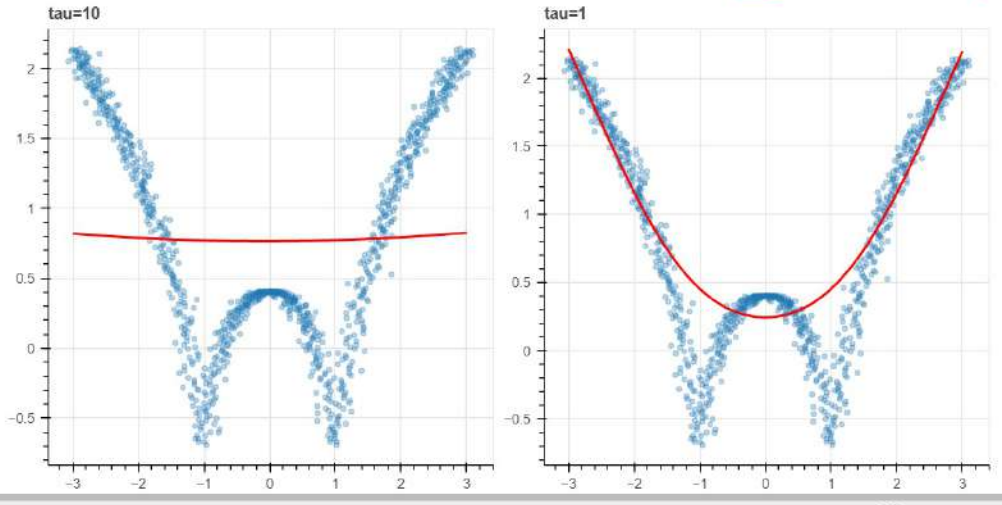
Code

Python (Pyodide)

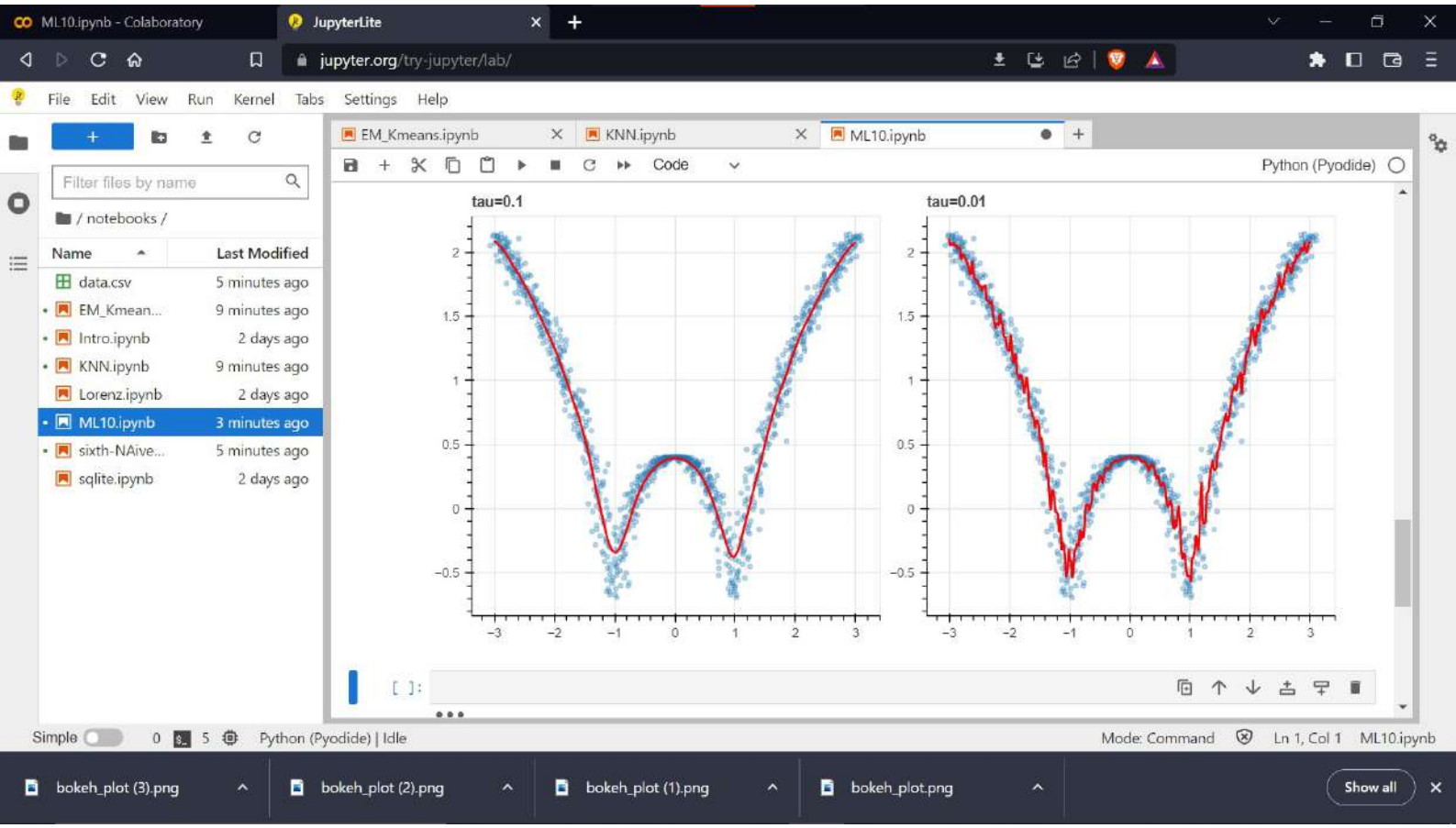
```
    [plot_lwr(0.1), plot_lwr(0.01)]
]))
```

BokehJS 2.4.3 successfully loaded.



Simple 0 5 Python (Pyodide) | Idle

Mode: Command Ln 1, Col 1 ML10.ipynb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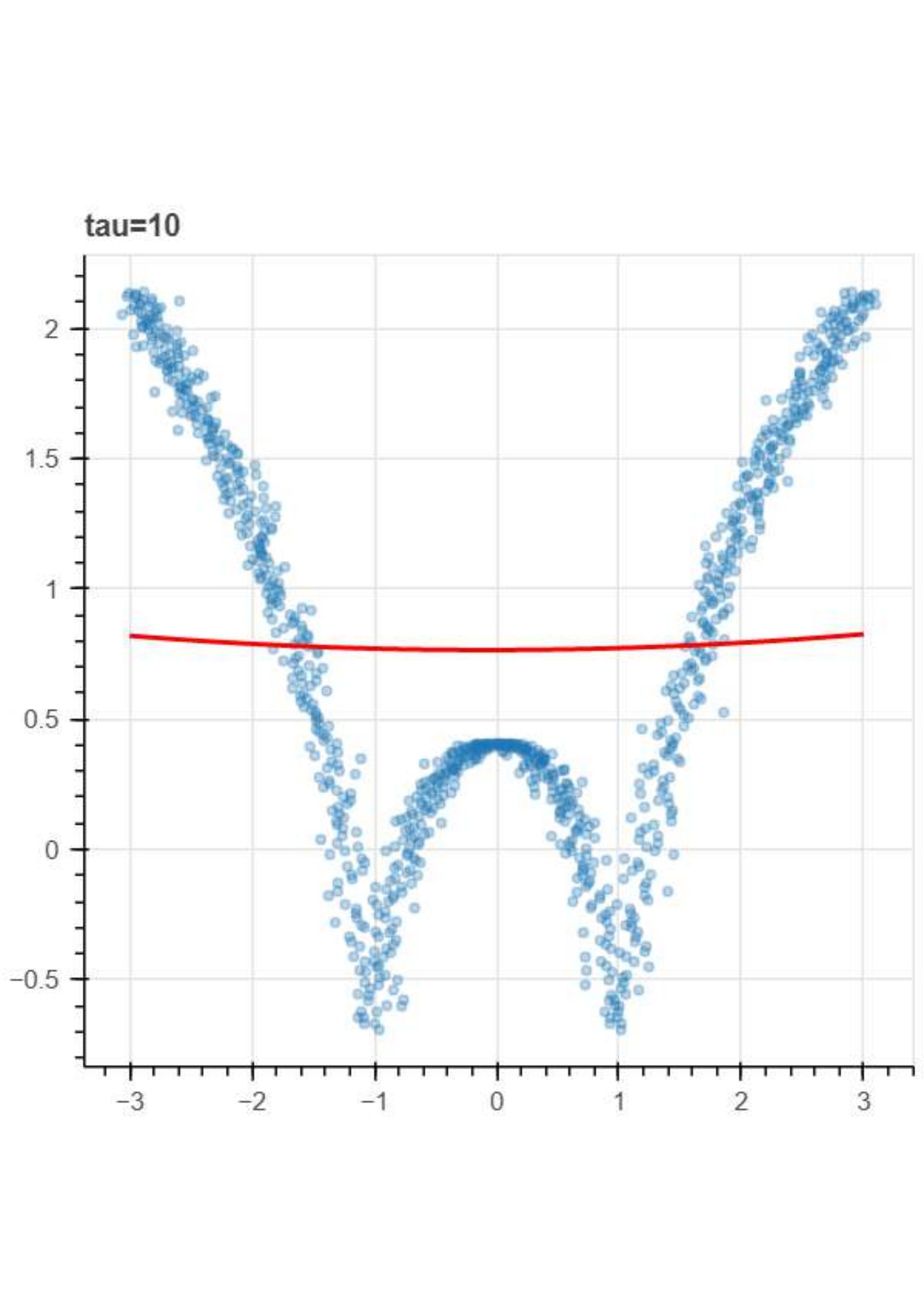
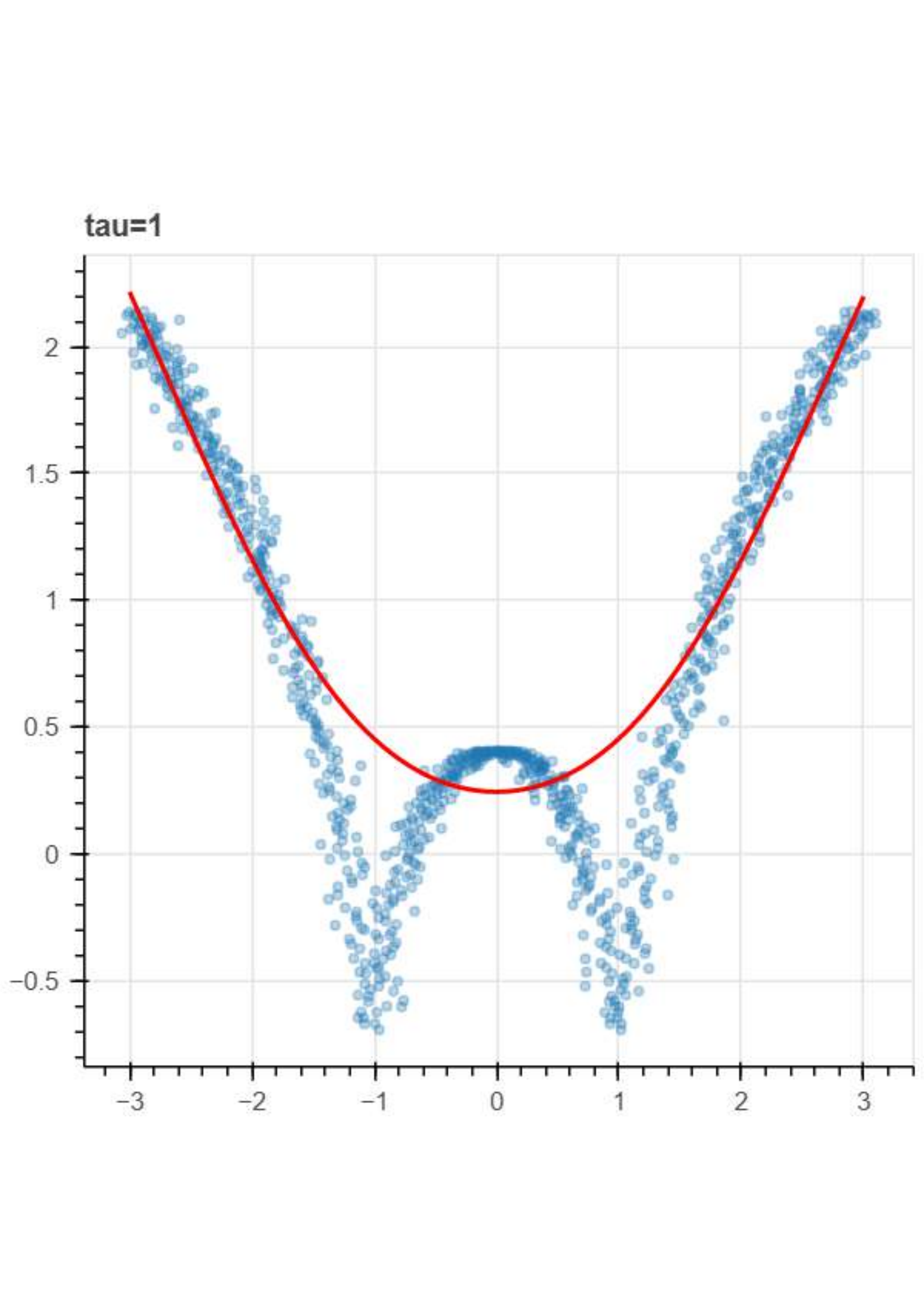
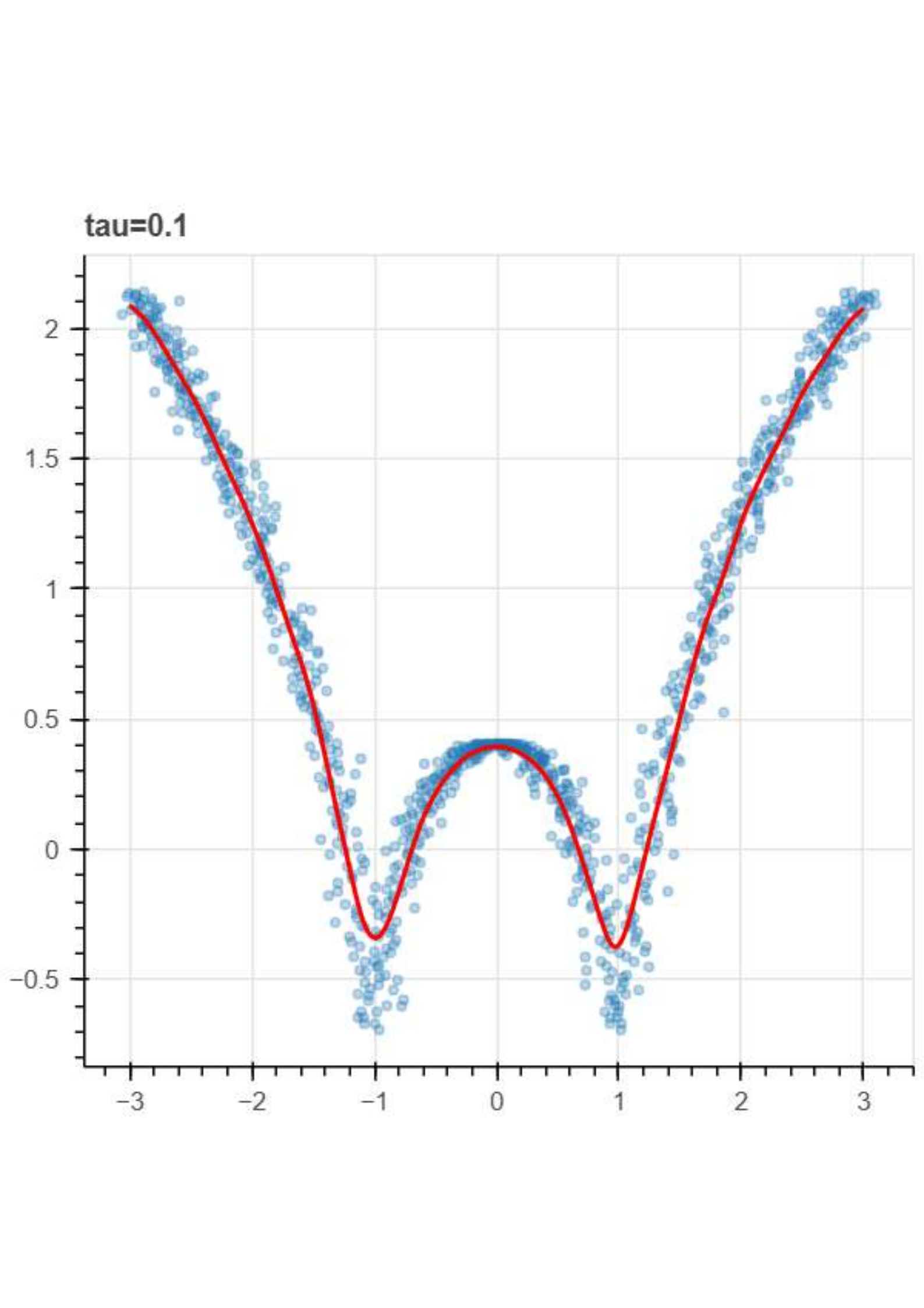
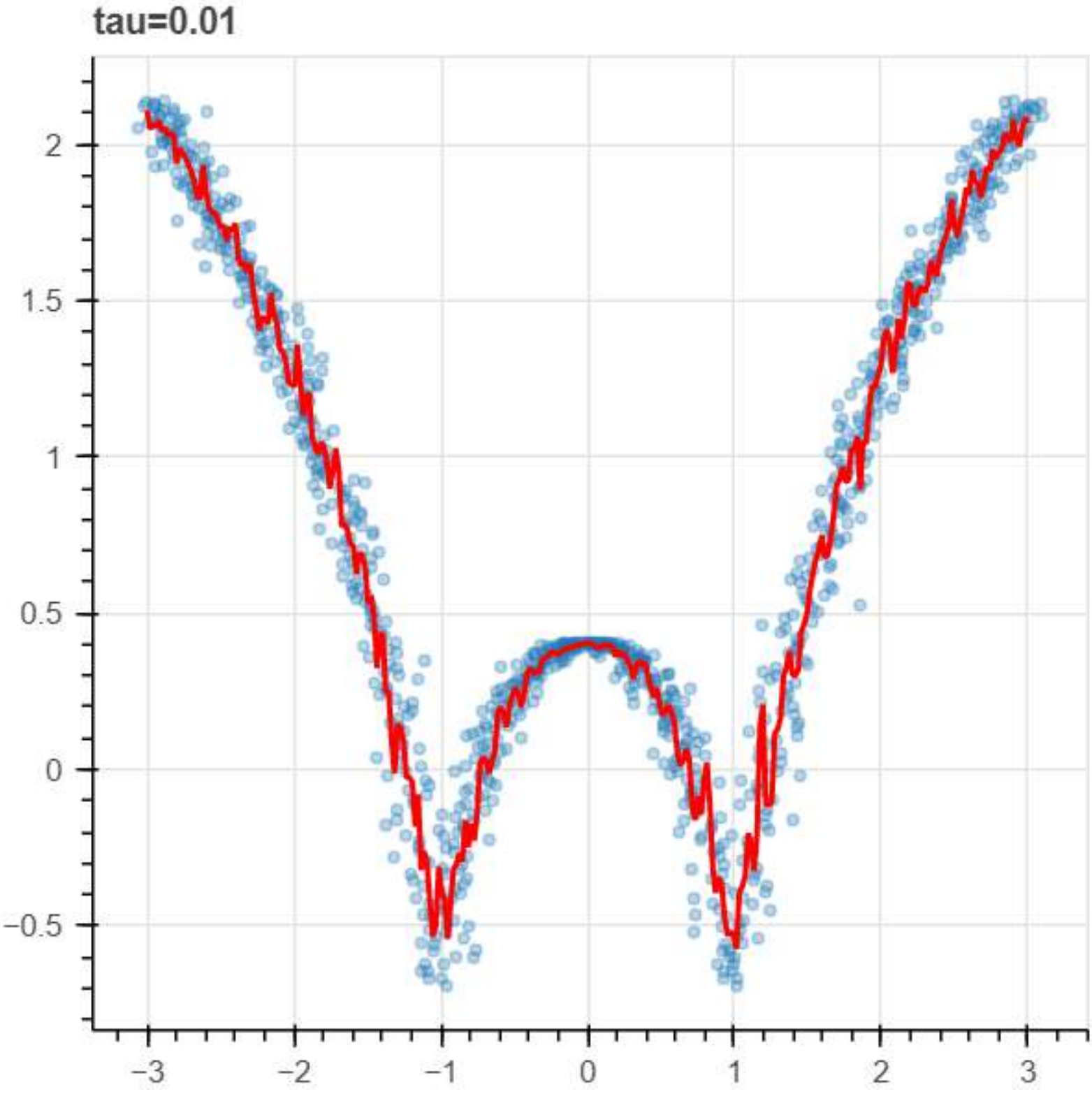
KNN.ipynb
ML10.ipynb
Code
Python (Pyodide)
tau=0.1
tau=0.01
Simple
Python (Pyodide) | Idle
Mode: Command
Ln 1, Col 1
ML10.ipynb
bokeh_plot (3).png
bokeh_plot (2).png
bokeh_plot (1).png
bokeh_plot.png
Show all


tau=10
2
1.5
1
0.5
0
−0.5
−3
−2
−1
0
1
2
3


tau=1
2
1.5
1
0.5
0
−0.5
−3
−2
−1
0
1
2
3


tau=0.1
2
1.5
1
0.5
0
−0.5
−3
−2
−1
0
1
2
3


tau=0.01
2
1.5
1
0.5
0
−0.5
−3
−2
−1
0
1
2
3