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Implement non-parametric Locally weighted Regression algorithm in order to fit data points. Select appropriate dataset for your experiment and draw graphs.

```
import numpy as np
from bokeh.plotting import figure, show, output_notebook
from bokeh.layouts import gridplot
from bokeh.io import push_notebook
def local_regression(x0, x, y, tau):
    x0 = np.r_[1, x0]
    x = np.c_[np.ones(len(x)), x]
    xw = x.T * radial_kernel(x0, x, tau)
    beta = np.linalg.pinv(xw @ x) @ xw @ y
    return x0 @ beta
def radial_kernel(x0, x, tau):
    return np.exp(np.sum((x, -x0) ** 2, axis=1)/
                  (-2 * tau * tau))
n = 1000
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) + 0.5)
print("The Fitting curve Data set (10 samples) Y:\n",
      y[1:10])
x += np.random.normal(scale=0.1, size=1)
print("Normalized (10 samples) x :\n", x[1:10])
domain = np.linspace(-3, 3, num=300)
print("x Domain space (10 samples) :\n",
      domain[1:10])
```

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```
def plot_lwr(tau):
    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=0.3)
    plot.line(domain, prediction, line_width=2,
                                        color='red')
    return plot
show(gridplot([
[plot_lwr(10.0), plot_lwr(1.0)],
[plot_lwr(0.1), plot_lwr(0.01)]]))
```

Output:

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:

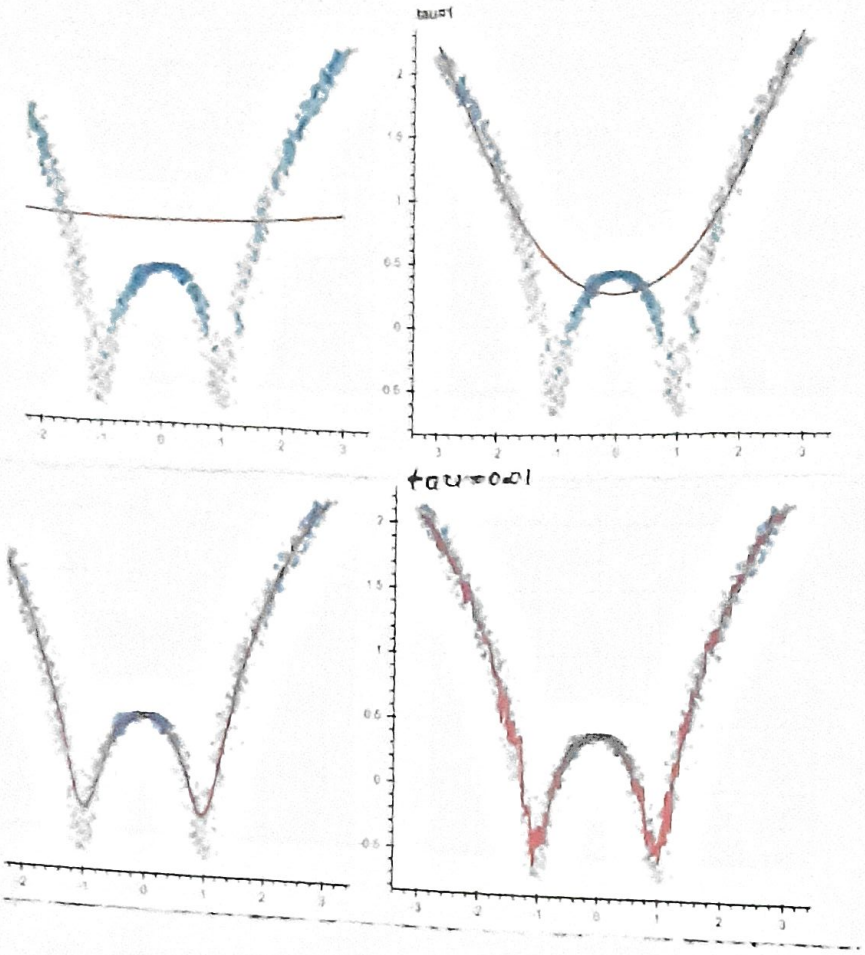
[2.13582188 2.13156804 2.12730867 2.12303166
2.11874898 2.11445659 2.11015444 2.10584249
2.10152068]

Normalized (10 samples) X:

[-3.16789698 -3.01221757 -3.08648291
-3.06442811 -3.12047421 -3.01821598
-3.07793156 -3.00792465 -2.78023511]

X0 Domain space (10 samples):

[-2.97993311 -2.95986622 -2.93979933
-2.91973244 -2.89966555 -2.87959866
-2.85953177 -2.83946488 -2.81939799]


tau=1
tau=0.01