`pandas.plotting` subpackage

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Pandas provides some extra plotting functions for a few select plot types.

About the Data

In this notebook, we will be working with Facebook's stock price throughout 2018.

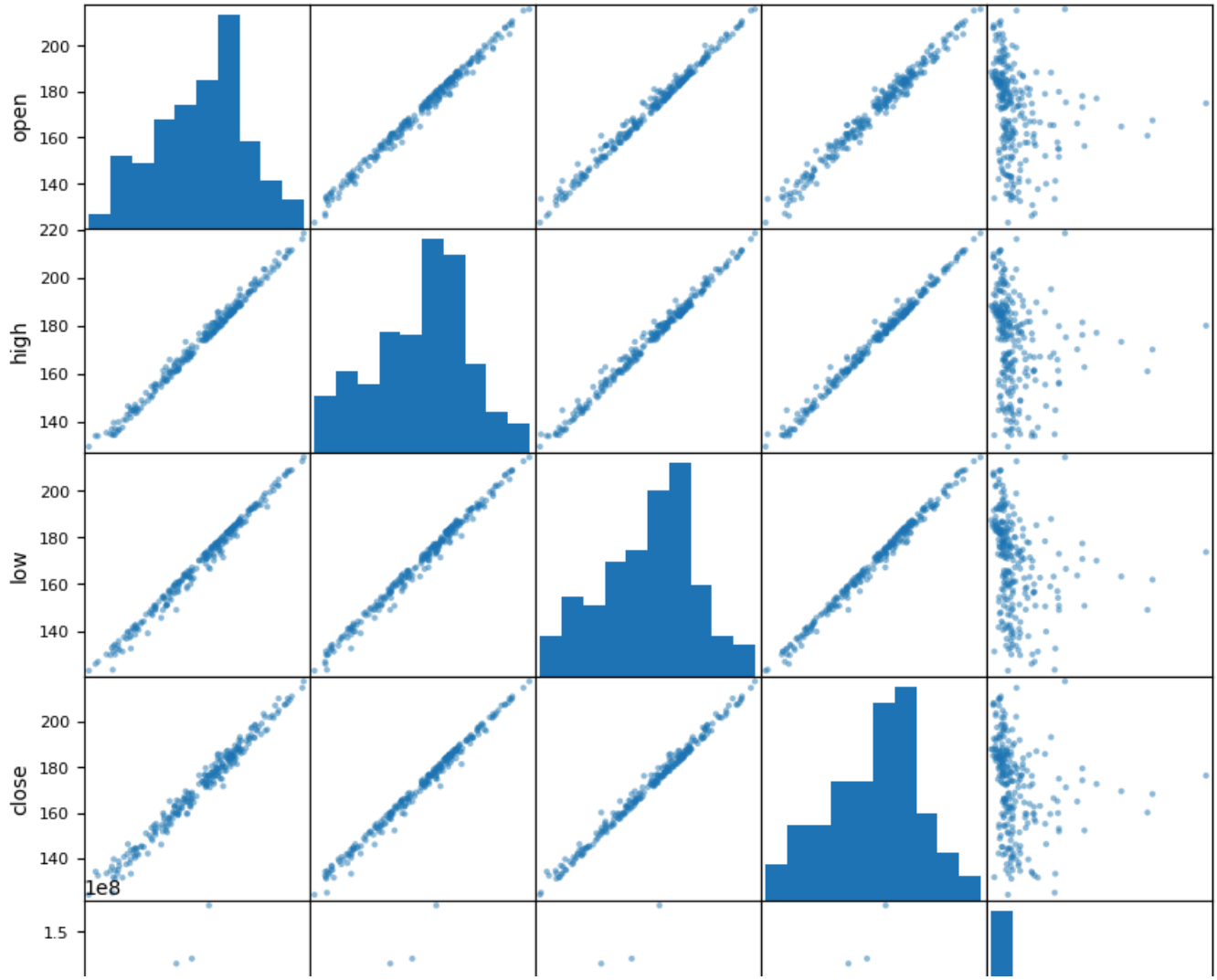
Setup

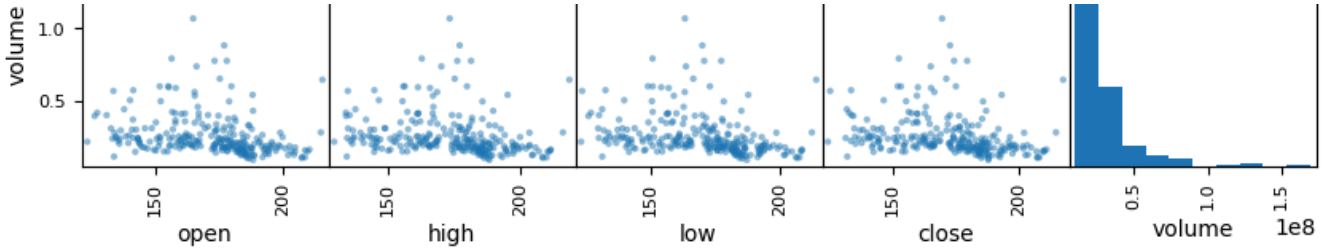
```
%matplotlib inline
import matplotlib.pyplot as mpl
import numpy as ny
import pandas as p

fb = p.read_csv(
    '/content/fb_stock_prices_2018.csv', index_col='date', parse_dates=True
)
```

Scatter matrix

```
from pandas.plotting import scatter_matrix
scatter_matrix(fb, figsize=(10, 10))
```

```
array([[<Axes: xlabel='open', ylabel='open'>,
        <Axes: xlabel='high', ylabel='open'>,
        <Axes: xlabel='low', ylabel='open'>,
        <Axes: xlabel='close', ylabel='open'>,
        <Axes: xlabel='volume', ylabel='open'>],
       [<Axes: xlabel='open', ylabel='high'>,
        <Axes: xlabel='high', ylabel='high'>,
        <Axes: xlabel='low', ylabel='high'>,
        <Axes: xlabel='close', ylabel='high'>,
        <Axes: xlabel='volume', ylabel='high'>],
       [<Axes: xlabel='open', ylabel='low'>,
        <Axes: xlabel='high', ylabel='low'>,
        <Axes: xlabel='low', ylabel='low'>,
        <Axes: xlabel='close', ylabel='low'>,
        <Axes: xlabel='volume', ylabel='low'>],
       [<Axes: xlabel='open', ylabel='close'>,
        <Axes: xlabel='high', ylabel='close'>,
        <Axes: xlabel='low', ylabel='close'>,
        <Axes: xlabel='close', ylabel='close'>,
        <Axes: xlabel='volume', ylabel='close'>],
       [<Axes: xlabel='open', ylabel='volume'>,
        <Axes: xlabel='high', ylabel='volume'>,
        <Axes: xlabel='low', ylabel='volume'>,
        <Axes: xlabel='close', ylabel='volume'>,
        <Axes: xlabel='volume', ylabel='volume'>]], dtype=object)
```

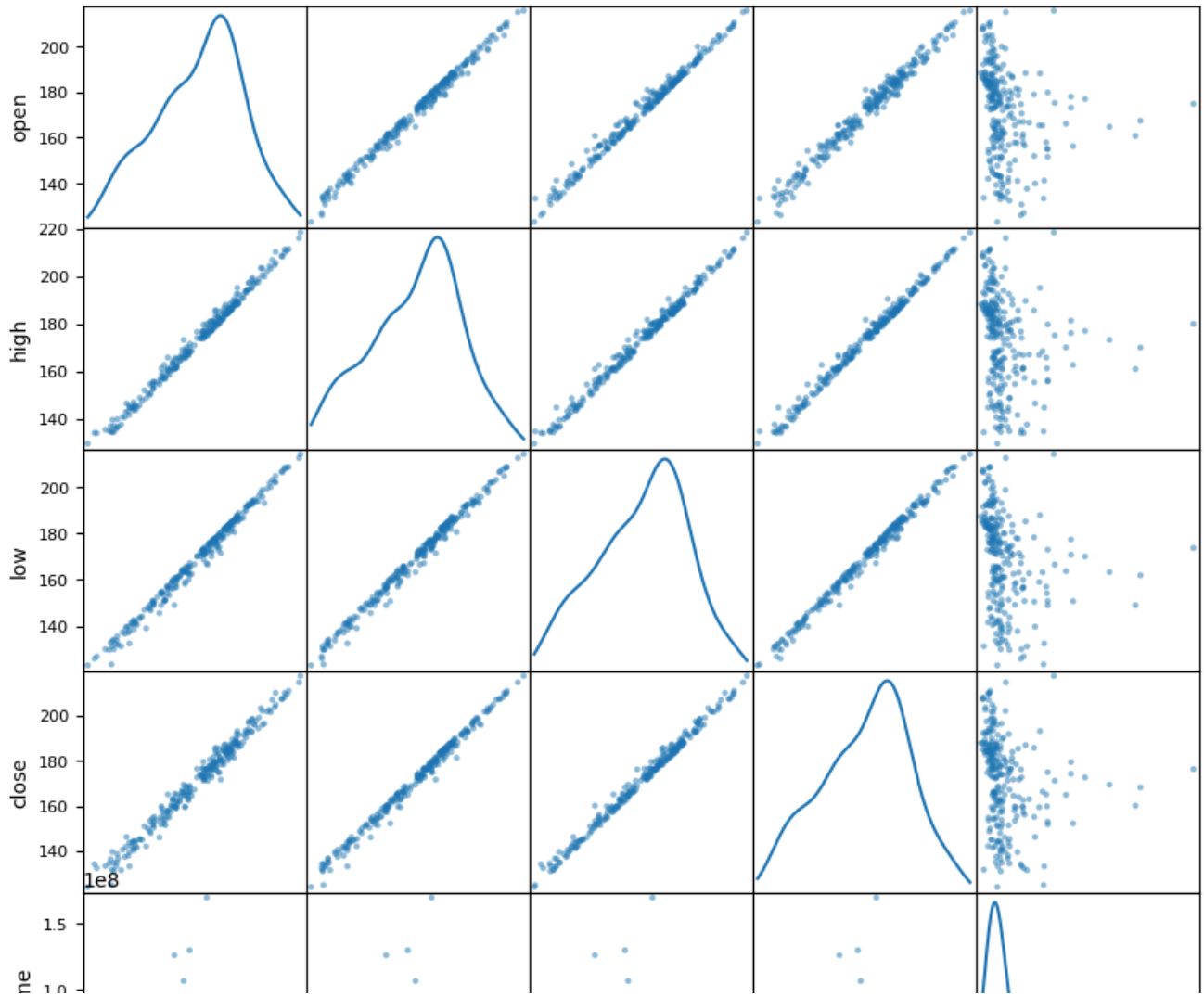


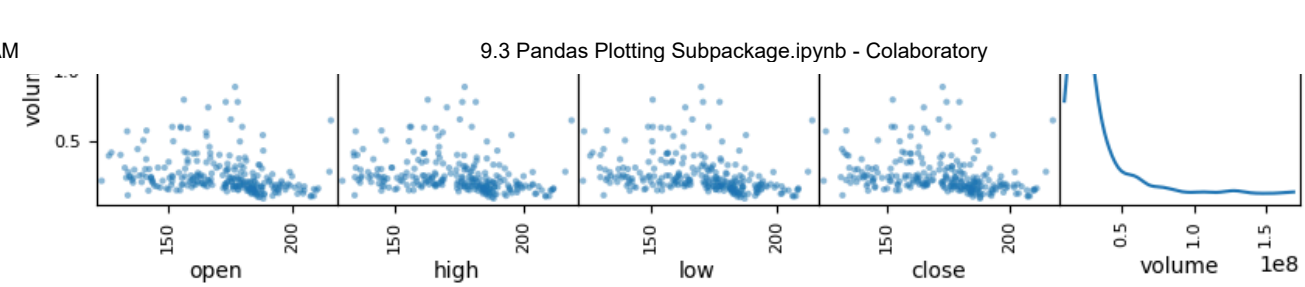


Changing the diagonal from histograms to KDE:

```
1 scatter_matrix(fb, figsize=(10, 10), diagonal='kde')
```

```
array([[<Axes: xlabel='open', ylabel='open'>,
        <Axes: xlabel='high', ylabel='open'>,
        <Axes: xlabel='low', ylabel='open'>,
        <Axes: xlabel='close', ylabel='open'>,
        <Axes: xlabel='volume', ylabel='open'>],
       [<Axes: xlabel='open', ylabel='high'>,
        <Axes: xlabel='high', ylabel='high'>,
        <Axes: xlabel='low', ylabel='high'>,
        <Axes: xlabel='close', ylabel='high'>,
        <Axes: xlabel='volume', ylabel='high'>],
       [<Axes: xlabel='open', ylabel='low'>,
        <Axes: xlabel='high', ylabel='low'>,
        <Axes: xlabel='low', ylabel='low'>,
        <Axes: xlabel='close', ylabel='low'>,
        <Axes: xlabel='volume', ylabel='low'>],
       [<Axes: xlabel='open', ylabel='close'>,
        <Axes: xlabel='high', ylabel='close'>,
        <Axes: xlabel='low', ylabel='close'>,
        <Axes: xlabel='close', ylabel='close'>,
        <Axes: xlabel='volume', ylabel='close'>],
       [<Axes: xlabel='open', ylabel='volume'>,
        <Axes: xlabel='high', ylabel='volume'>,
        <Axes: xlabel='low', ylabel='volume'>,
        <Axes: xlabel='close', ylabel='volume'>,
        <Axes: xlabel='volume', ylabel='volume'>]], dtype=object)
```



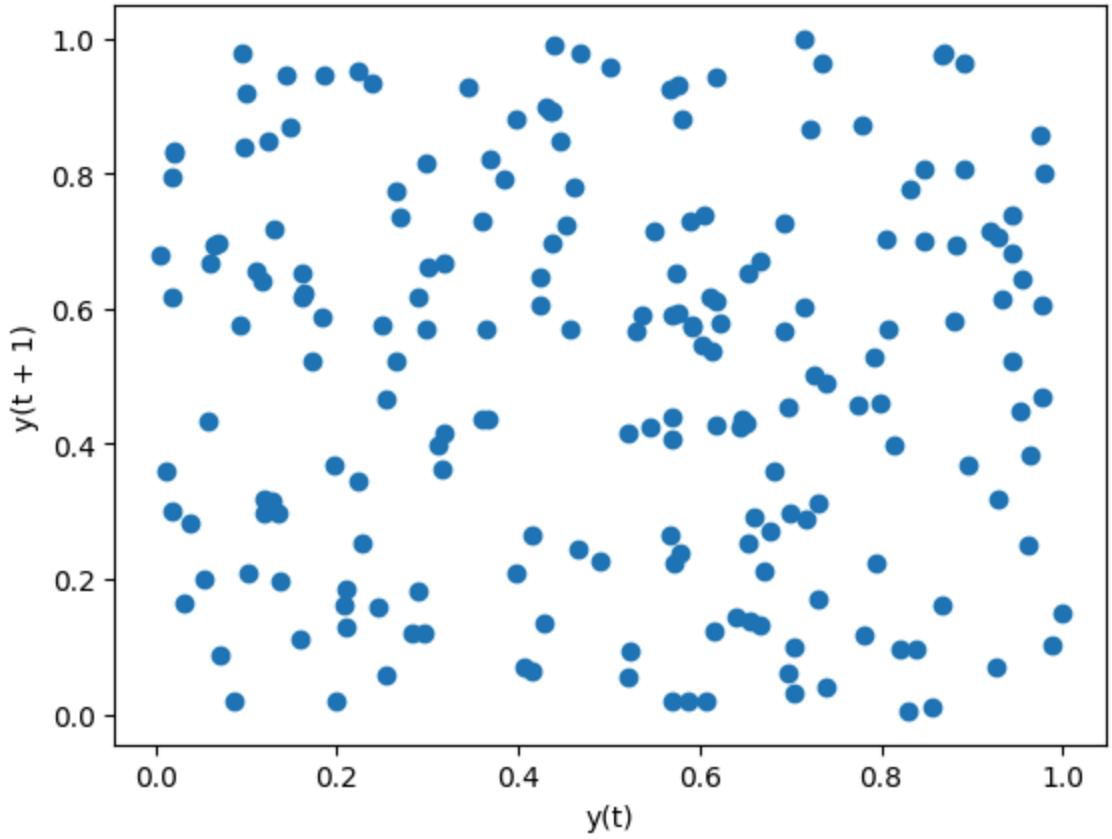


Lag plot

Lag plots let us see how the variable correlations with past observations of itself. Random data has no pattern:

```
1 from pandas.plotting import lag_plot
2 ny.random.seed(0) # make this repeatable
3 lag_plot(p.Series(ny.random.random(size=200)))
```

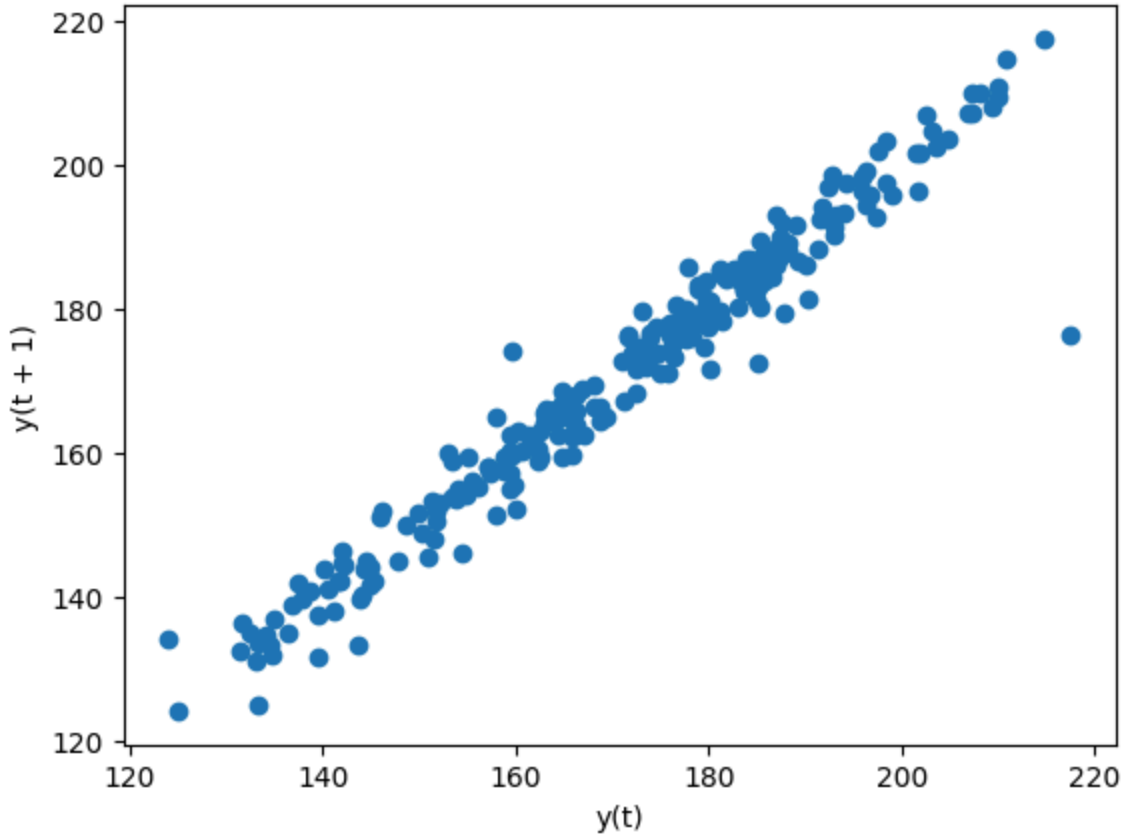
```
<Axes: xlabel='y(t)', ylabel='y(t + 1)'>
```



Data with some level of correlation to itself (autocorrelation) may have patterns. Stock prices are highly auto-correlated:

```
1 lag_plot(fb.close)
```

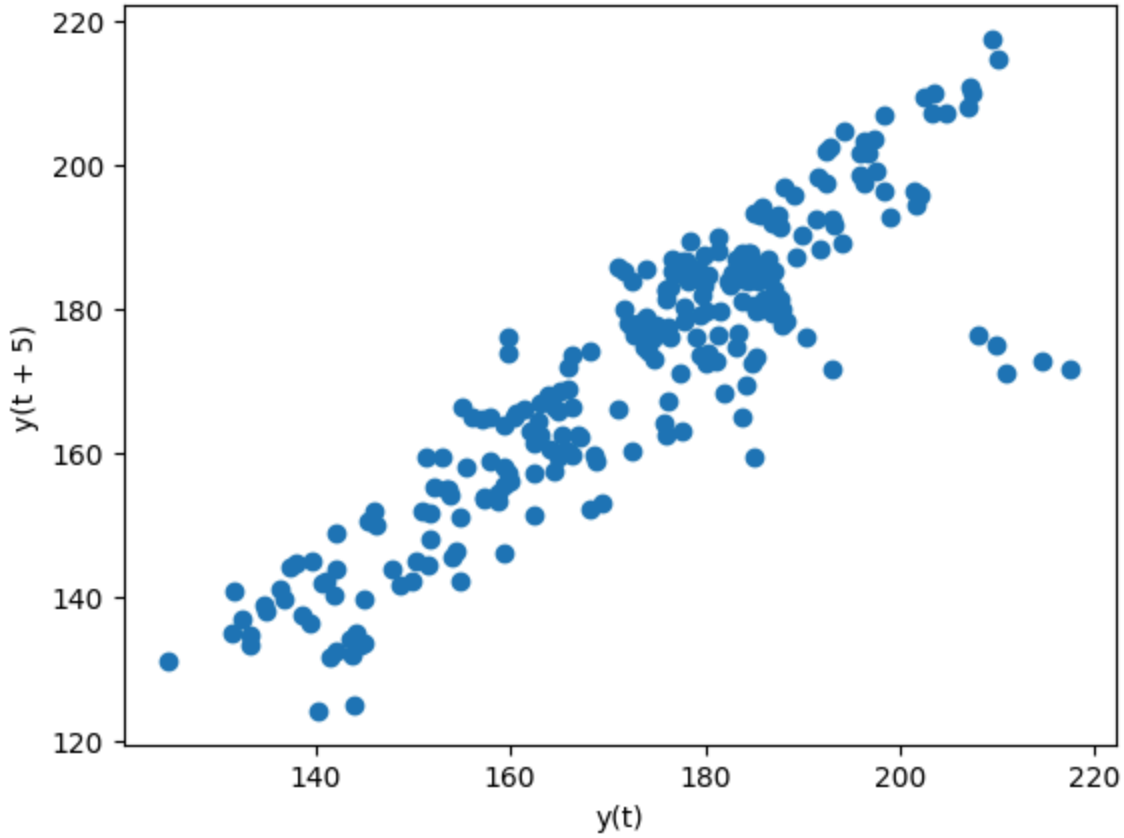
```
<Axes: xlabel='y(t)', ylabel='y(t + 1)'>
```



The default lag is 1, but we can alter this with the `lag` parameter. Let's look at a 5 day lag (a week of trading activity):

```
1 lag_plot(fb.close, lag=5)
```

```
<Axes: xlabel='y(t)', ylabel='y(t + 5)'>
```

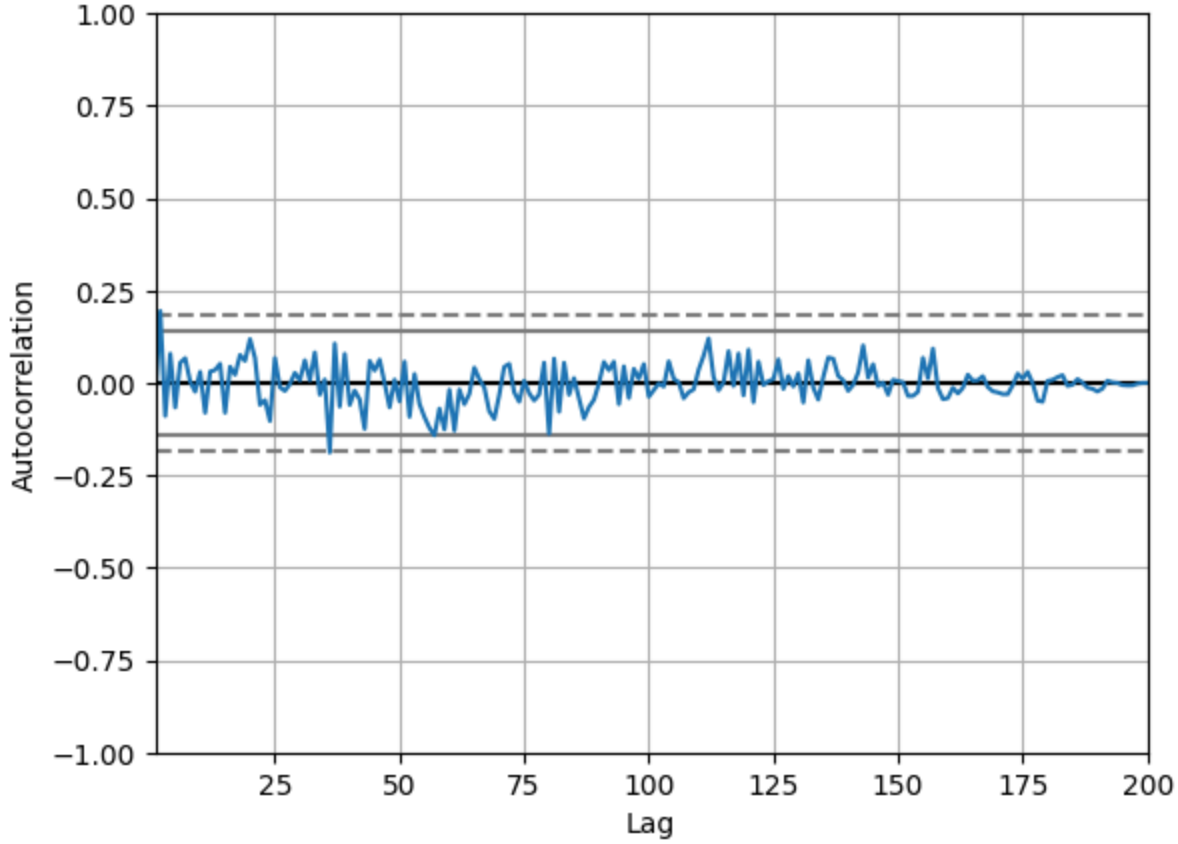


Autocorrelation plots

We can use the autocorrelation plot to see if this relationship may be meaningful or just noise. Random data will not have any significant autocorrelation (it stays within the bounds below):

```
1 from pandas.plotting import autocorrelation_plot
2 ny.random.seed(0) # make this repeatable
3 autocorrelation_plot(p.Series(ny.random.random(size=200)))
```

```
<Axes: xlabel='Lag', ylabel='Autocorrelation'>
```



Stock data, on the other hand, does have significant autocorrelation:

```
1 autocorrelation_plot(fb.close)
```

```
<Axes: xlabel='Lag', ylabel='Autocorrelation'>
```

Bootstrap plot

This plot helps us understand the uncertainty in our summary statistics:

```
1 from pandas.plotting import bootstrap_plot
2 fig = bootstrap_plot(fb.volume, fig=mpl.figure(figsize=(10, 6)))
```