

# autocorrelation

May 10, 2024

## 1 Autocorrelation

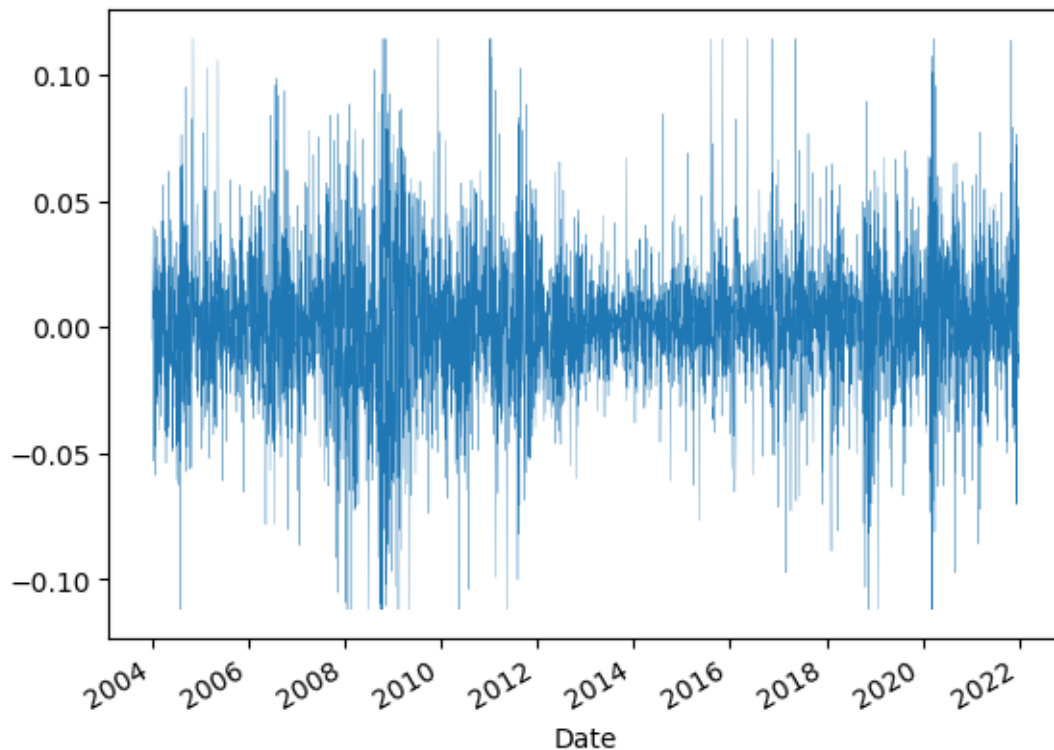
```
[ ]: import matplotlib.pyplot as plt
import sys

sys.path.insert(1, "/Users/simon/Documents/II/Dissertation/")
from src.misc import load_processed_dataset

%load_ext autoreload
%autoreload 2
```

```
[ ]: df = load_processed_dataset("NVDA", "2004-01-01", "2022-01-01")
df["log_return"].plot(linewidth=0.2)
```

```
[ ]: <Axes: xlabel='Date'>
```



Is the series stationary? We perform ADF test.

```
[ ]: from statsmodels.tsa.stattools import adfuller
```

```
result = adfuller(df["log_return"])
print("ADF Statistic: %f" % result[0])
print("p-value: %f" % result[1])
print("Critical Values:")
for key, value in result[4].items():
    print("\t%s: %.3f" % (key, value))
```

ADF Statistic: -16.515268

p-value: 0.000000

Critical Values:

1%: -3.432

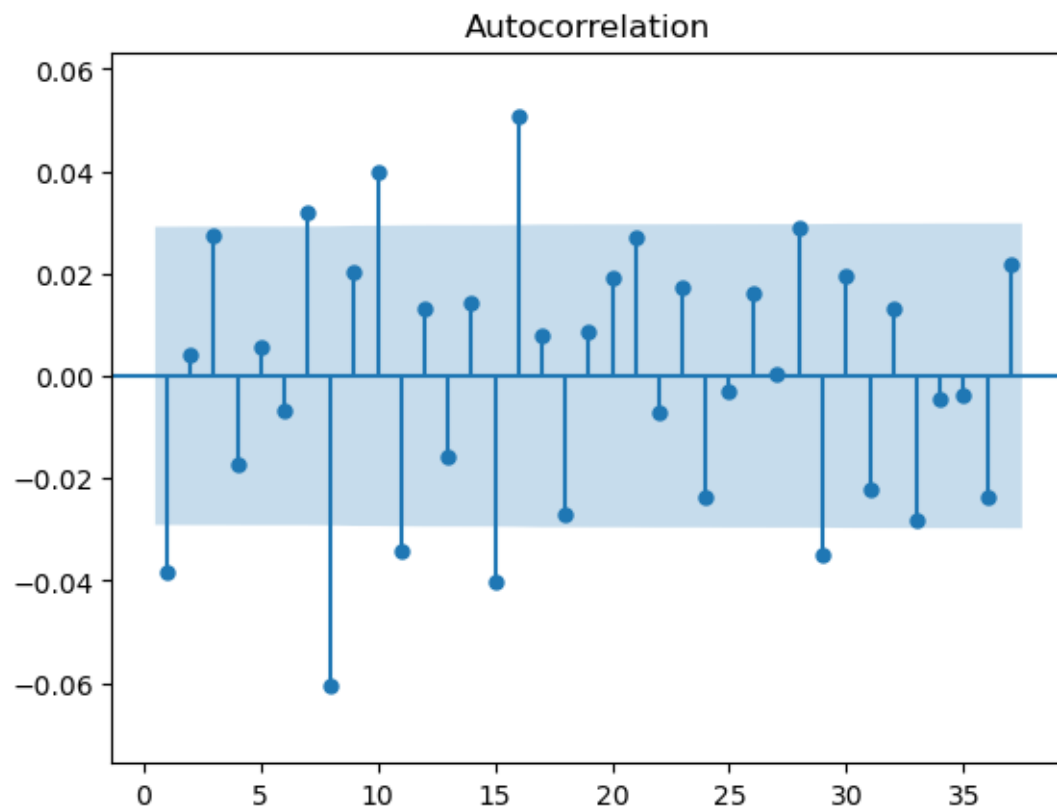
5%: -2.862

10%: -2.567

Is data aurocorrelated? ACF shows the correlation of a time series with itself at different lags, PCF plot shows the correlation of a time series with itself at different lags, after removing the effects of the previous lags.

```
[ ]: from statsmodels.graphics.tsaplots import plot_acf
```

```
fig, ax = plt.subplots(1)
plot_acf(df["log_return"], ax=ax, zero=False, auto_ylims=True)
plt.show()
```



```
[ ]: from statsmodels.graphics.tsaplots import plot_pacf  
  
plot_pacf(df["log_return"], zero=False, auto_ylims=True)  
plt.show()
```

