

# APO

September 29, 2021

## 1 Absolute Price Oscillator (APO)

<https://library.tradingtechnologies.com/trade/chrt-ti-absolute-price-oscillator.html>

```
[1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings("ignore")

# fix_yahoo_finance is used to fetch data
import fix_yahoo_finance as yf
yf.pdr_override()
```

```
[2]: # input
symbol = 'AAPL'
start = '2018-08-01'
end = '2018-12-31'

# Read data
df = yf.download(symbol, start, end)

# View Columns
df.head()
```

[\*\*\*\*\*100%\*\*\*\*\*] 1 of 1 downloaded

```
[2]:
```

|            | Open       | High       | Low        | Close      | Adj Close  | \ |
|------------|------------|------------|------------|------------|------------|---|
| Date       |            |            |            |            |            |   |
| 2018-08-01 | 199.130005 | 201.759995 | 197.309998 | 201.500000 | 198.478760 |   |
| 2018-08-02 | 200.580002 | 208.380005 | 200.350006 | 207.389999 | 204.280457 |   |
| 2018-08-03 | 207.029999 | 208.740005 | 205.479996 | 207.990005 | 204.871445 |   |
| 2018-08-06 | 208.000000 | 209.250000 | 207.070007 | 209.070007 | 205.935257 |   |
| 2018-08-07 | 209.320007 | 209.500000 | 206.759995 | 207.110001 | 204.004639 |   |

|      | Volume |
|------|--------|
| Date |        |

```
2018-08-01    67935700
2018-08-02    62404000
2018-08-03    33447400
2018-08-06    25425400
2018-08-07    25587400
```

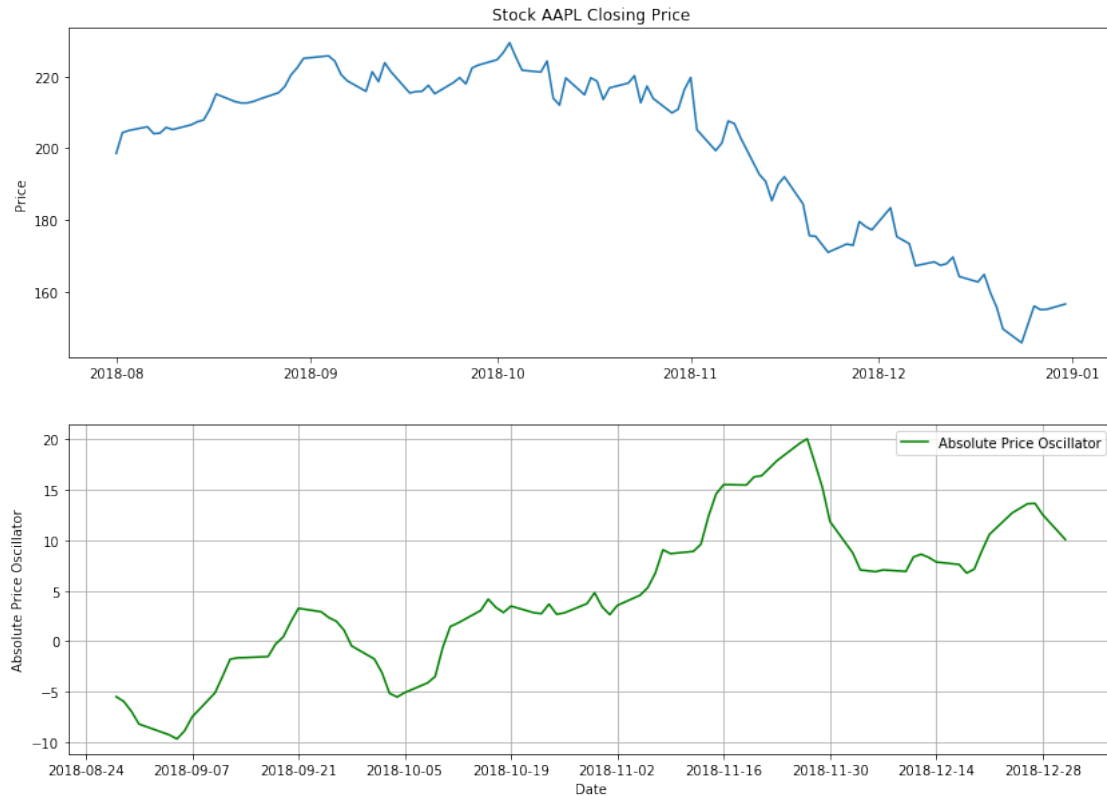
```
[3]: df['HL'] = (df['High'] + df['Low'])/2
df['HLC'] = (df['High'] + df['Low'] + df['Adj Close'])/3
df['HLCC'] = (df['High'] + df['Low'] + df['Adj Close'] + df['Adj Close'])/4
df['OHLC'] = (df['Open'] + df['High'] + df['Low'] + df['Adj Close'])/4
```

```
[4]: df['Long_Cycle'] = df['Adj Close'].rolling(20).mean()
df['Short_Cycle'] = df['Adj Close'].rolling(5).mean()
df['APO'] = df['Long_Cycle'] - df['Short_Cycle']
```

```
[5]: fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
ax1.set_title('Stock ' + symbol + ' Closing Price')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['APO'], label='Absolute Price Oscillator', color='green')
ax2.grid()
ax2.set_ylabel('Absolute Price Oscillator')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

```
[5]: <matplotlib.legend.Legend at 0x1aa2dbec048>
```



## 1.1 Candlestick with Absolute Price Oscillator (APO)

```
[6]: from matplotlib import dates as mdates
import datetime as dt

dfc = df.copy()
dfc['VolumePositive'] = dfc['Open'] < dfc['Adj Close']
#dfc = dfc.dropna()
dfc = dfc.reset_index()
dfc['Date'] = mdates.date2num(dfc['Date'].astype(dt.date))
dfc.head()
```

```
[6]:
```

|   | Date     | Open       | High       | Low        | Close      | Adj Close  | \ |
|---|----------|------------|------------|------------|------------|------------|---|
| 0 | 736907.0 | 199.130005 | 201.759995 | 197.309998 | 201.500000 | 198.478760 |   |
| 1 | 736908.0 | 200.580002 | 208.380005 | 200.350006 | 207.389999 | 204.280457 |   |
| 2 | 736909.0 | 207.029999 | 208.740005 | 205.479996 | 207.990005 | 204.871445 |   |
| 3 | 736912.0 | 208.000000 | 209.250000 | 207.070007 | 209.070007 | 205.935257 |   |
| 4 | 736913.0 | 209.320007 | 209.500000 | 206.759995 | 207.110001 | 204.004639 |   |

|   | Volume   | HL         | HLC        | HLCC       | OHLC       | Long_Cycle | \ |
|---|----------|------------|------------|------------|------------|------------|---|
| 0 | 67935700 | 199.534997 | 199.182918 | 199.006878 | 199.169690 | NaN        |   |

|   |          |            |            |            |            |     |
|---|----------|------------|------------|------------|------------|-----|
| 1 | 62404000 | 204.365005 | 204.336823 | 204.322731 | 203.397618 | NaN |
| 2 | 33447400 | 207.110001 | 206.363815 | 205.990723 | 206.530361 | NaN |
| 3 | 25425400 | 208.160004 | 207.418421 | 207.047630 | 207.563816 | NaN |
| 4 | 25587400 | 208.129998 | 206.754878 | 206.067318 | 207.396160 | NaN |

|   | Short_Cycle | APO | VolumePositive |
|---|-------------|-----|----------------|
| 0 | NaN         | NaN | False          |
| 1 | NaN         | NaN | True           |
| 2 | NaN         | NaN | False          |
| 3 | NaN         | NaN | False          |
| 4 | 203.514112  | NaN | False          |

```
[7]: from mpl_finance import candlestick_ohlc

fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
candlestick_ohlc(ax1,dfc.values, width=0.5, colorup='g', colordown='r', alpha=1.
    ↪0)
ax1.xaxis_date()
ax1.xaxis.set_major_formatter(mdates.DateFormatter('%d-%m-%Y'))
ax1.grid(True, which='both')
ax1.minorticks_on()
ax1v = ax1.twinx()
colors = dfc.VolumePositive.map({True: 'g', False: 'r'})
ax1v.bar(dfc.Date, dfc['Volume'], color=colors, alpha=0.4)
ax1v.axes.yaxis.set_ticklabels([])
ax1v.set_ylim(0, 3*df.Volume.max())
ax1.set_title('Stock ' + symbol + ' Closing Price')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['APO'], label='Absolute Price Oscillator', color='green')
ax2.grid()
ax2.set_ylabel('Absolute Price Oscillator')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

```
[7]: <matplotlib.legend.Legend at 0x1aa2de21cf8>
```

