

# WSMA

September 29, 2021

## 1 Wilder's Smoothing Moving Average (WSMA)

<https://mahifx.com/mfxtrade/indicators/wilders-moving-average>

<https://www.theindicatorclub.com/product/wilders/>

```
[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 = '2019-01-01'

# 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	199.243088	
2018-08-02	200.580002	208.380005	200.350006	207.389999	205.067123	
2018-08-03	207.029999	208.740005	205.479996	207.990005	205.660416	
2018-08-06	208.000000	209.250000	207.070007	209.070007	206.728317	
2018-08-07	209.320007	209.500000	206.759995	207.110001	204.790268	

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

```
[3]: def WSMA(df, column="Adj Close", n=14):
      ema = df[column].ewm(span=n, min_periods=n - 1).mean()
      K = 1/n
      wsma = df[column] * K + ema * (1-K)
      return wsma
```

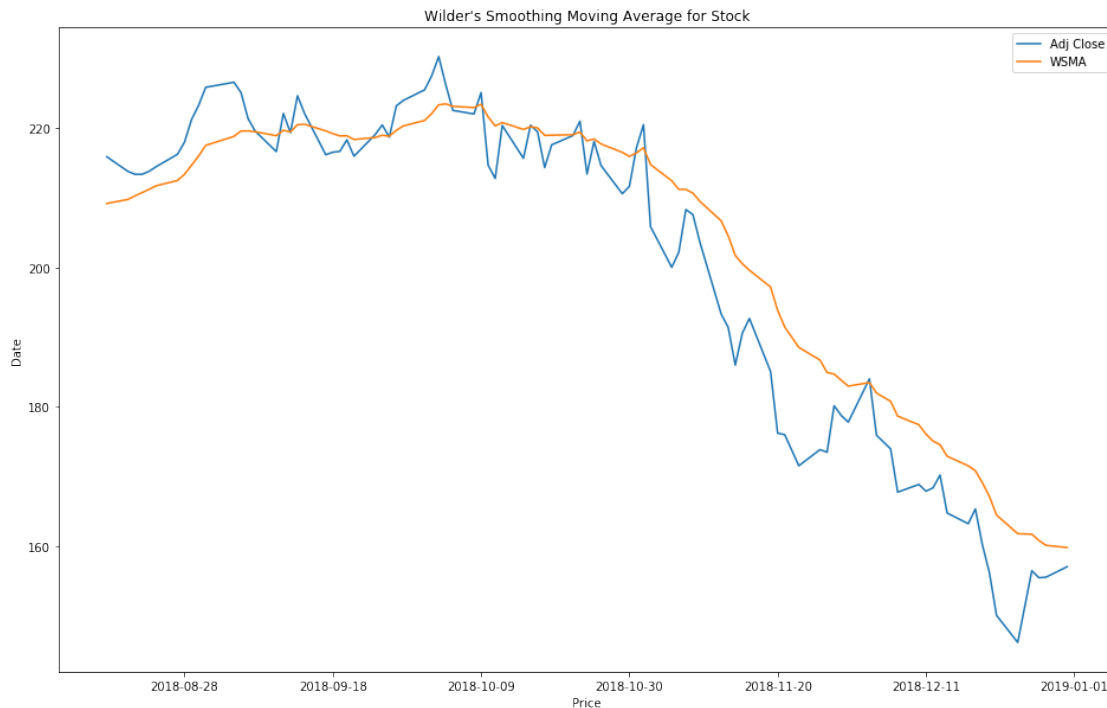
```
[4]: df['WSMA'] = WSMA(df, column="Adj Close", n=14)
      df = df.dropna()
      df.head()
```

```
[4]:
```

	Open	High	Low	Close	Adj Close \
Date					
2018-08-17	213.440002	217.949997	213.160004	217.580002	215.897522
2018-08-20	218.100006	219.179993	215.110001	215.460007	213.793930
2018-08-21	216.800003	217.190002	214.029999	215.039993	213.377167
2018-08-22	214.100006	216.360001	213.839996	215.050003	213.387085
2018-08-23	214.649994	217.050003	214.600006	215.490005	213.823685

	Volume	WSMA
Date		
2018-08-17	35427000	209.199048
2018-08-20	30287700	209.780113
2018-08-21	26159800	210.297928
2018-08-22	19018100	210.756849
2018-08-23	18883200	211.231745

```
[5]: plt.figure(figsize=(16,10))
      plt.plot(df['Adj Close'])
      plt.plot(df['WSMA'])
      plt.title("Wilder's Smoothing Moving Average for Stock")
      plt.legend(loc='best')
      plt.xlabel('Price')
      plt.ylabel('Date')
      plt.show()
```



## 1.1 Candlestick with WSMA

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

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

```
[6]:
```

	Date	Open	High	Low	Close	Adj Close \
0	736923.0	213.440002	217.949997	213.160004	217.580002	215.897522
1	736926.0	218.100006	219.179993	215.110001	215.460007	213.793930
2	736927.0	216.800003	217.190002	214.029999	215.039993	213.377167
3	736928.0	214.100006	216.360001	213.839996	215.050003	213.387085
4	736929.0	214.649994	217.050003	214.600006	215.490005	213.823685

	Volume	WSMA	VolumePositive
0	35427000	209.199048	True
1	30287700	209.780113	False
2	26159800	210.297928	False
3	19018100	210.756849	False

4 18883200 211.231745 False

```
[7]: from mpl_finance import candlestick_ohlc

fig = plt.figure(figsize=(16,8))
ax1 = plt.subplot(111)
candlestick_ohlc(ax1,df.values, width=0.5, colorup='g', colordown='r', alpha=1.
    ↪0)
ax1.plot(df.Date, df['WSMA'])
ax1.xaxis_date()
ax1.xaxis.set_major_formatter(mdates.DateFormatter('%d-%m-%Y'))
#ax1.axhline(y=dfc['Adj Close'].mean(),color='r')
ax1v = ax1.twinx()
colors = df.VolumePositive.map({True: 'g', False: 'r'})
ax1v.bar(df.Date, df['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')
ax1.set_xlabel('Date')
ax1.legend(loc='best')
```

[7]: <matplotlib.legend.Legend at 0x24bb49ddcf8>

