

Indikatoriai

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Vilnius 2018

Turinys

- Kas yra indikatoriai
- Kam jie naudojami
- Slenkantys vidurkiai
- Pagreičio indikatoriai
- Kintamumo indikatoriai
- Apyvartos indikatoriai
- Kombinuoti indikatoriai

Kas yra indikatoriai

- Indikatoriai
 - Apibendrina rinkos elgesį vienu skaičiumi
 - Bando nuprogozuoti rinkos elgseną ateityje
- Oscilatoriai
 - Tas pats kaip indikatoriai
 - Bet kinta tam tikrose ribose (pvz. nuo 0 iki 100)
 - Patogiau naudoti perkeliant nuo vieno instrumento prie kito (Akcija A 12,54, B 256,11)

Skaičiavimo pavyzdžiai

- Pagreitis

- $M_{10} = P_1 - P_{10}$

- Paprastas slenkantis vidurkis

- $MA_5 = (P_1 + P_2 + P_3 + P_4 + P_5) / 5$

- Eksponentinis slenkantis vidurkis

- $EMA_5 = P_1 \times \alpha + EMA_4 \times (1 - \alpha)$

Kam jie naudojami

- Kryptinė strategija
 - Pirk, kai kainos kyla
 - Parduok skolon, kai kainos krenta
- Kaip tai realizuoti ?
 - Jeigu $\text{rinkos_pagreitis}(p) > x$ pirk
 - Jeigu $\text{rinkos_pagreitis}(p) < -x$ parduok
 - rinkos_pagreitis – funkcija grąžina rinkos pagreitį paskaičiuotą per p dienų, x yra pagreičio stiprumas

PVZ.

input: period(10), x(1);

var: mom(0);

mom = Momentum(close, period);

If mom > x then buy this bar close;

If mom < -x then sellshort this bar close;

PVZ.

input: period(10), x(1);

var: mom(0), vol(0);

mom = Momentum(close, period);

vol = volatility(period);

If $\text{mom} > \text{vol} * x$ then buy this bar close;

If $\text{mom} < -\text{vol} * x$ then sellshort this bar close;

Slenkantys vidurkiai

- Dažniausiai naudojamas įrankis

$$MA_5 = (P_1 + P_2 + P_3 + P_4 + P_5) / 5$$

$$MA_5 = P_1 \times 1/5 + P_2 \times 1/5 + P_3 \times 1/5 + P_4 \times 1/5 + P_5 \times 1/5$$

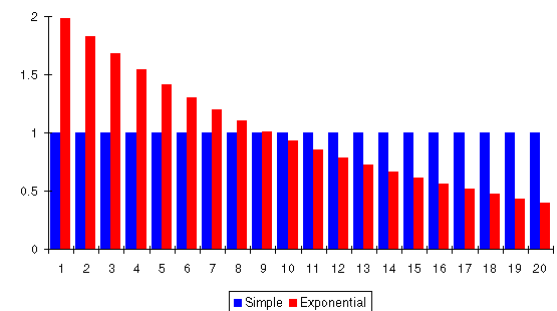
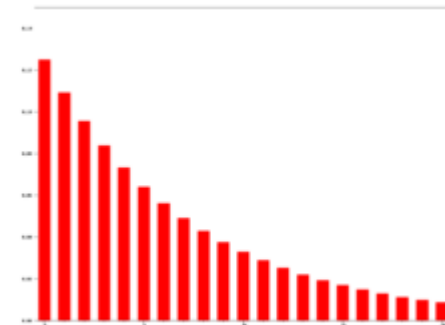
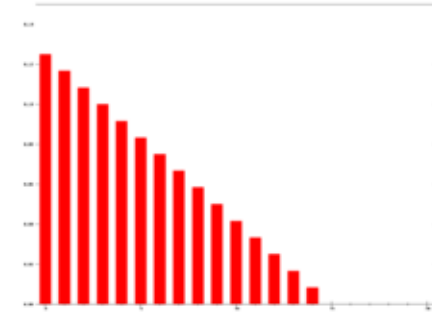
$$MA_5 = P_1 \times S_1 + P_2 \times S_2 + P_3 \times S_3 + P_4 \times S_4 + P_5 \times S_5 \quad \text{čia} \quad S_i = 1/5$$

Bet S_i gali būti įvairūs

Slenkantys vidurkiai

- Suglotnina duomenis
- Bet atsiranda atsilikimas
- Simple Moving Average
- Weighted moving average
- Exponential moving average

$$S_t = \alpha \times Y_{t-1} + (1 - \alpha) \times S_{t-1}$$



SMA

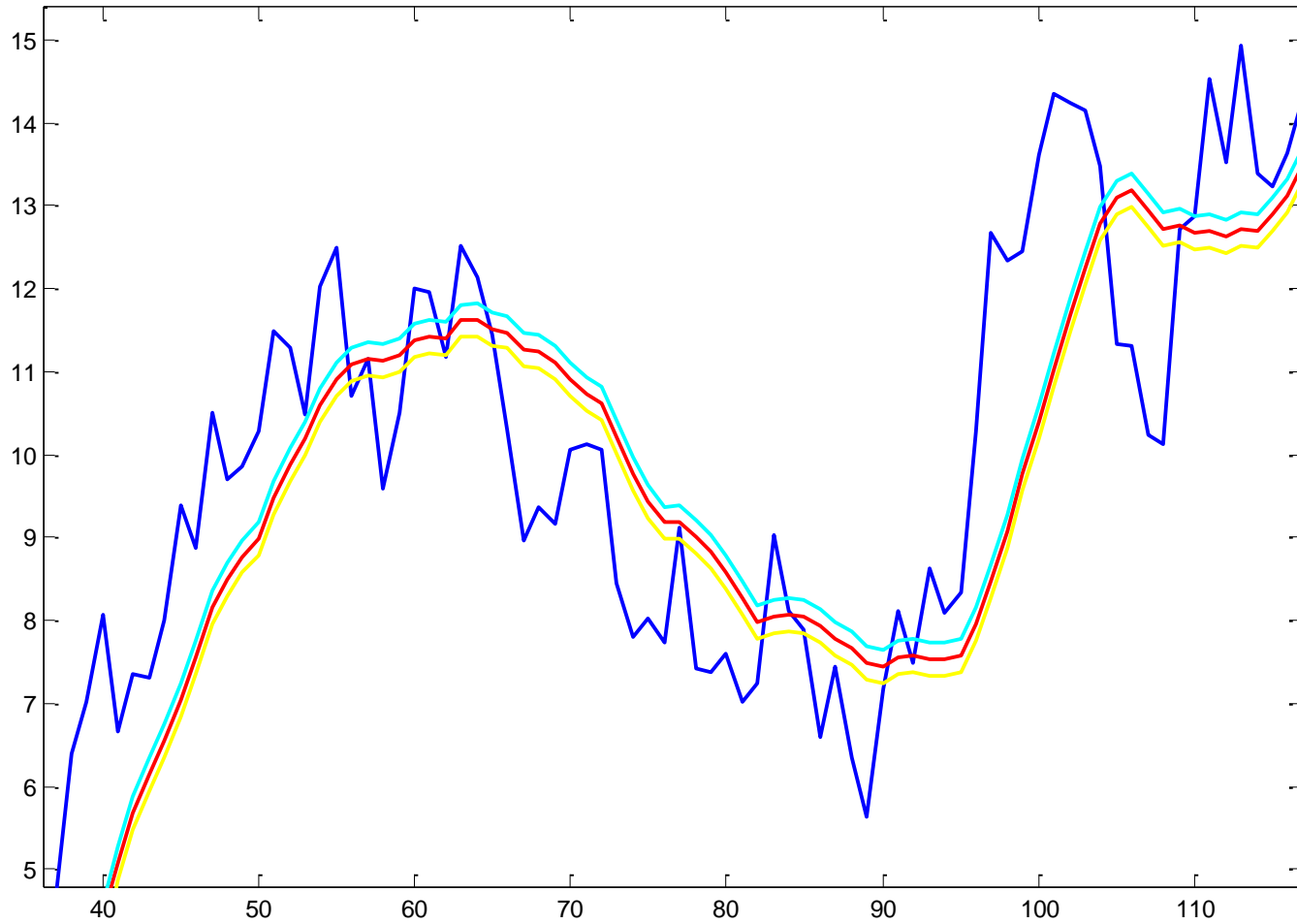
```
p=10;  
ln = length(c);  
m = zeros(1,ln);  
for i=p:ln  
    m(i) = sum(c(i-p+1:i)) / p;  
end
```

```
p=10;  
ln = length(c);  
m = zeros(1,ln);  
wei = ones(1,p) * (1/p);  
for i=p:ln  
    m(i) = c(i-p+1:i) * wei';  
end
```

SMA

```
p=10;  
ln = length(c);  
m = zeros(1,ln);  
m(p) = sum(c(1:p))/p;  
for i=p+1:ln  
    m(i) = m(i-1) - c(i-p)/p + c(i)/p;  
end
```

SMA



Glotnumas vs atsilikimas

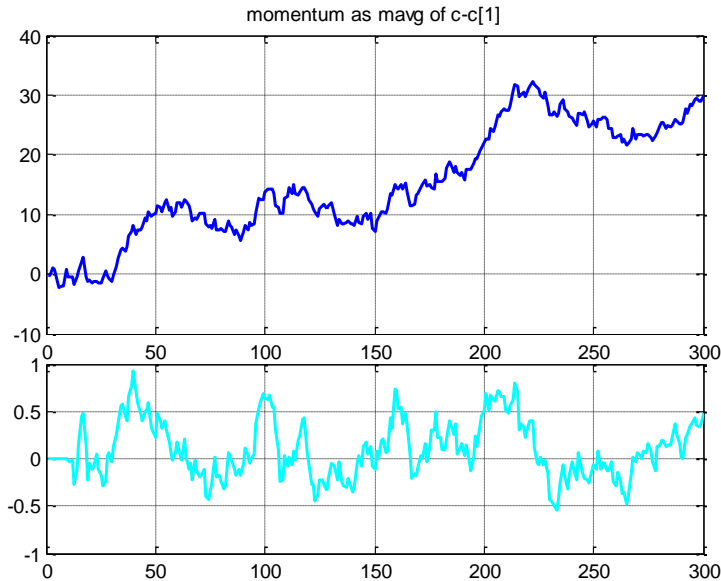
- Slenkantys vidurkiai suglotnina duomenis
- Bet dėl to atsiranda atsilikimas

- Idealiai būtų rasti glotnų, bet mažai atsiliekančių slenkantį vidurkį

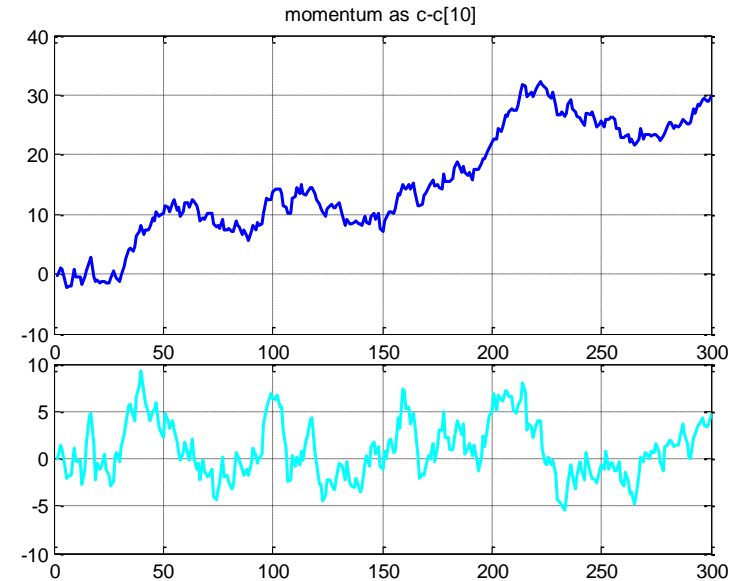
Pagreičio indikatoriai

- Pagreitis (momentum) parodo, kaip greitai rinka kyla arba leidžiasi
- Paprastą pagreitį galima suskaičiuoti imant skirtumą tarp šiandien ir 10 dienų atgal
- Arba naudojant MA ir sumuojant pasikeitimus pvz. `close[šiandien] – close[vakar]`

Paprastas pagreitis



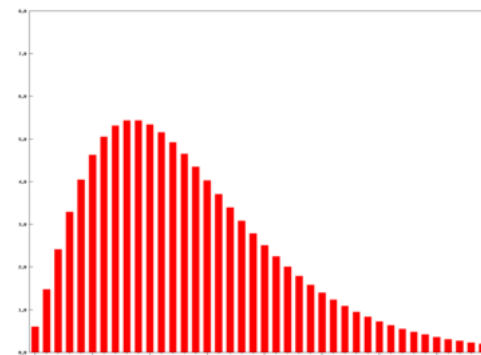
```
figure(2);clf;  
subplot(5,1,[1:3]); plot(c,'LineWidth',2);grid  
on;title('momentum as mavg of c-c[1]');  
mom = mavg(c - c([1 1:end-1]),10);  
subplot(5,1,[4:5]);  
plot(mom,'c','LineWidth',2);grid on;
```



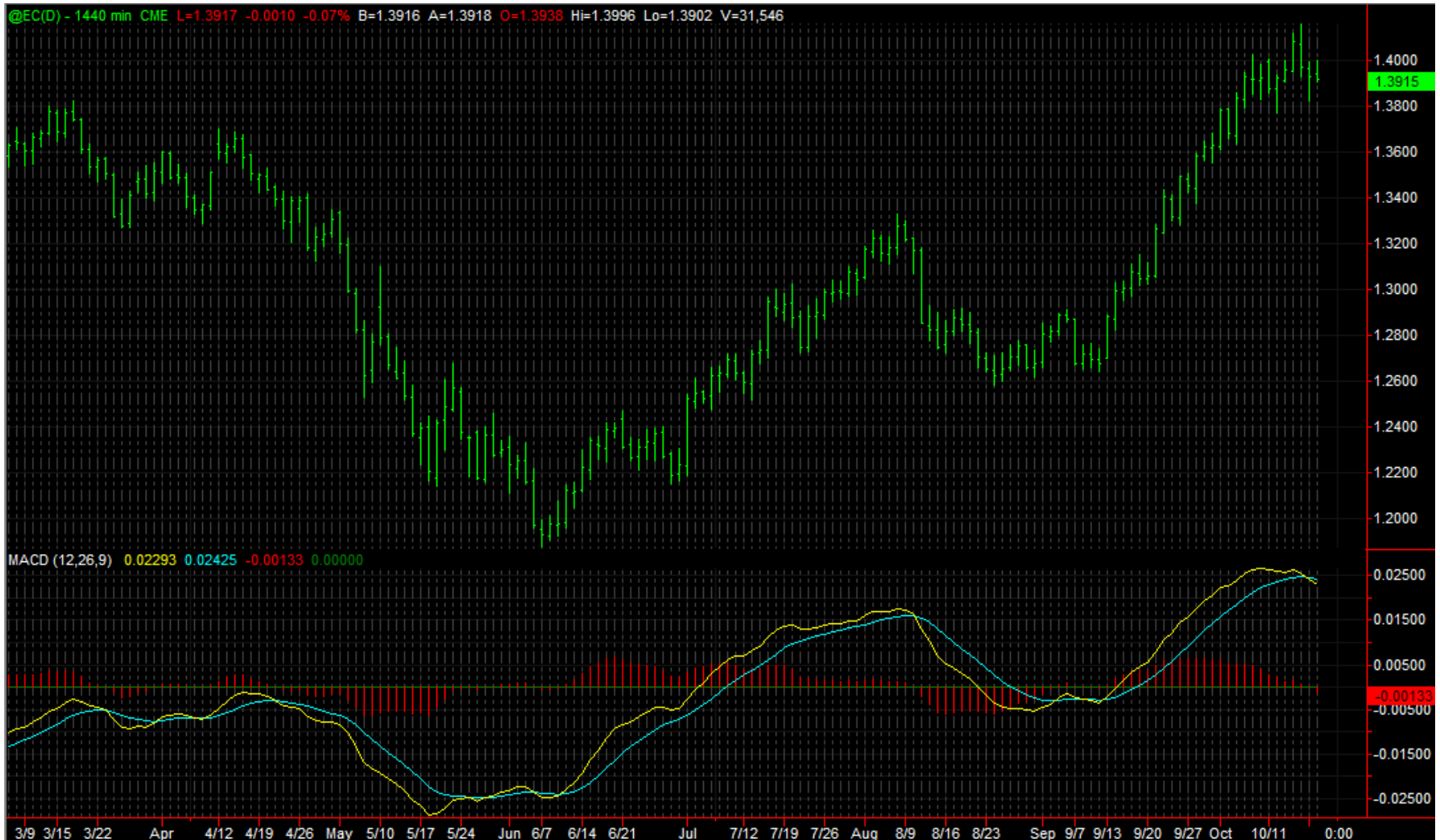
```
figure(3);clf;  
subplot(5,1,[1:3]); plot(c,'LineWidth',2);grid  
on;title('momentum as c-c[10]');  
mom = c - lag_series(c,10);  
subplot(5,1,[4:5]);  
plot(mom,'c','LineWidth',2);grid on;
```

Kiti pagreičio indikatoriai

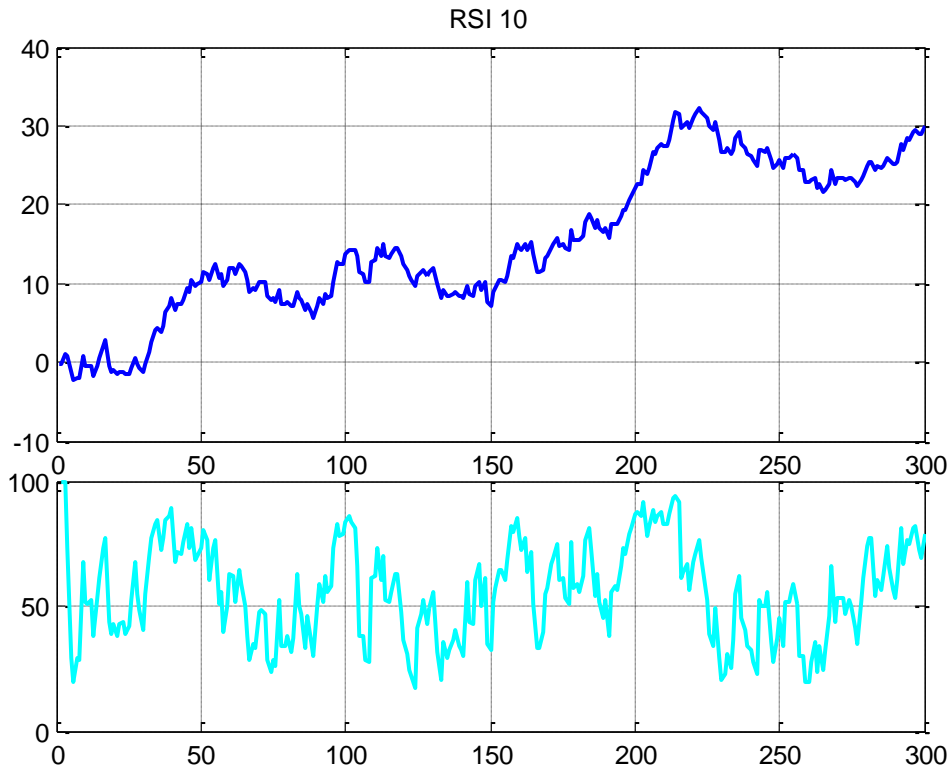
- RSI Indicator - Relative Strength Index
- Stochastic Oscillator (SO)
- StochRSI
- TRIX - triple exponential
- Moving Average Convergence-Divergence (MACD)
- Daugybė kitų



Moving Average Convergence-Divergence (MACD)

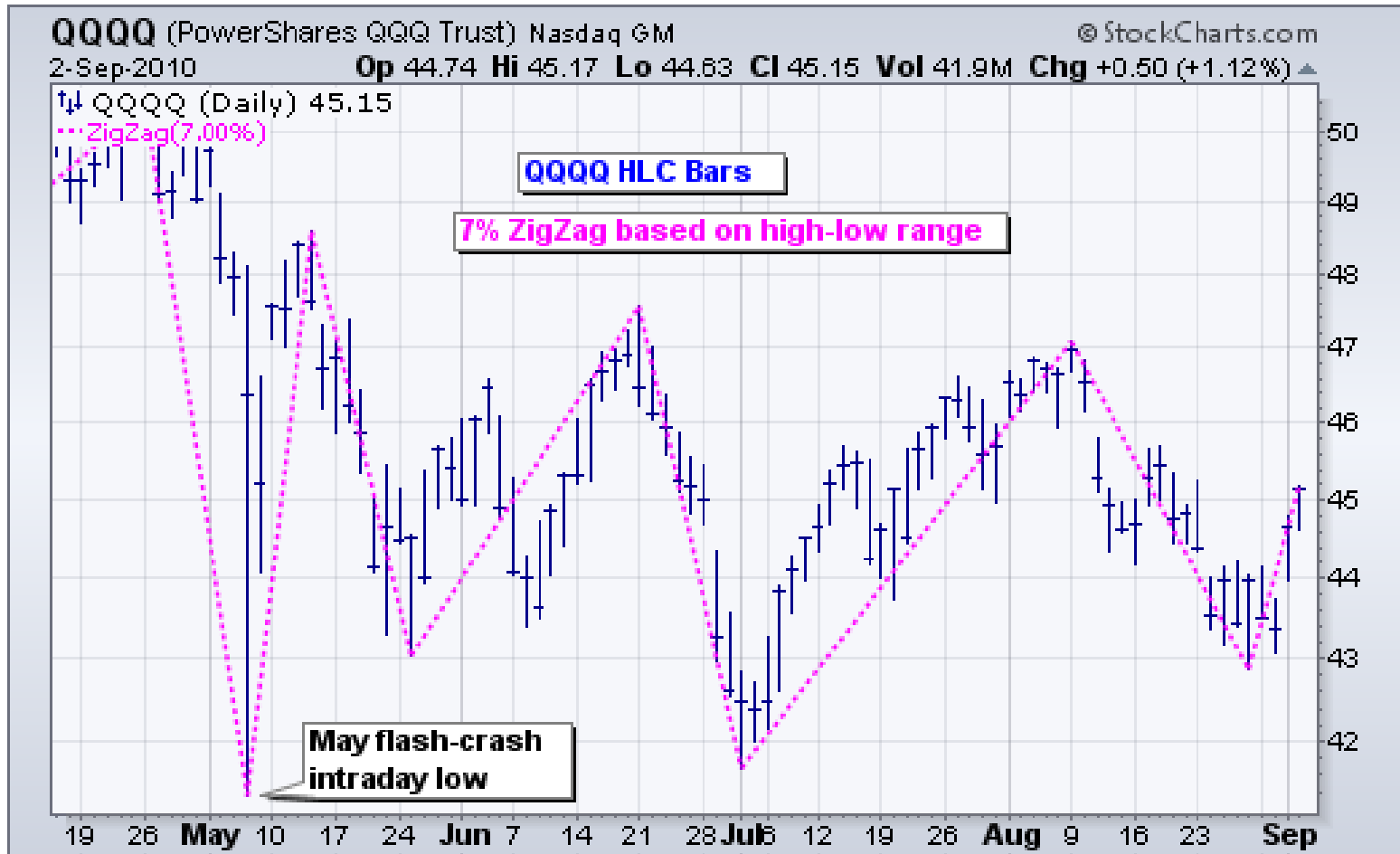


RSI



```
p=10;  
pnl = c - c([1 1:end-1])  
U = pnl; U(U < 0) = 0;  
D = pnl; D(D > 0) = 0;  
RS = emavg(U,p)./emavg(-D,p);  
RSI = 100 - 100 ./ (1 + RS);  
figure(4);subplot(5,1,[1:3]);  
plot(c,'LineWidth',2);grid on;title('RSI 10');  
subplot(5,1,[4:5]);  
plot(RSI,'c','LineWidth',2);grid on;
```

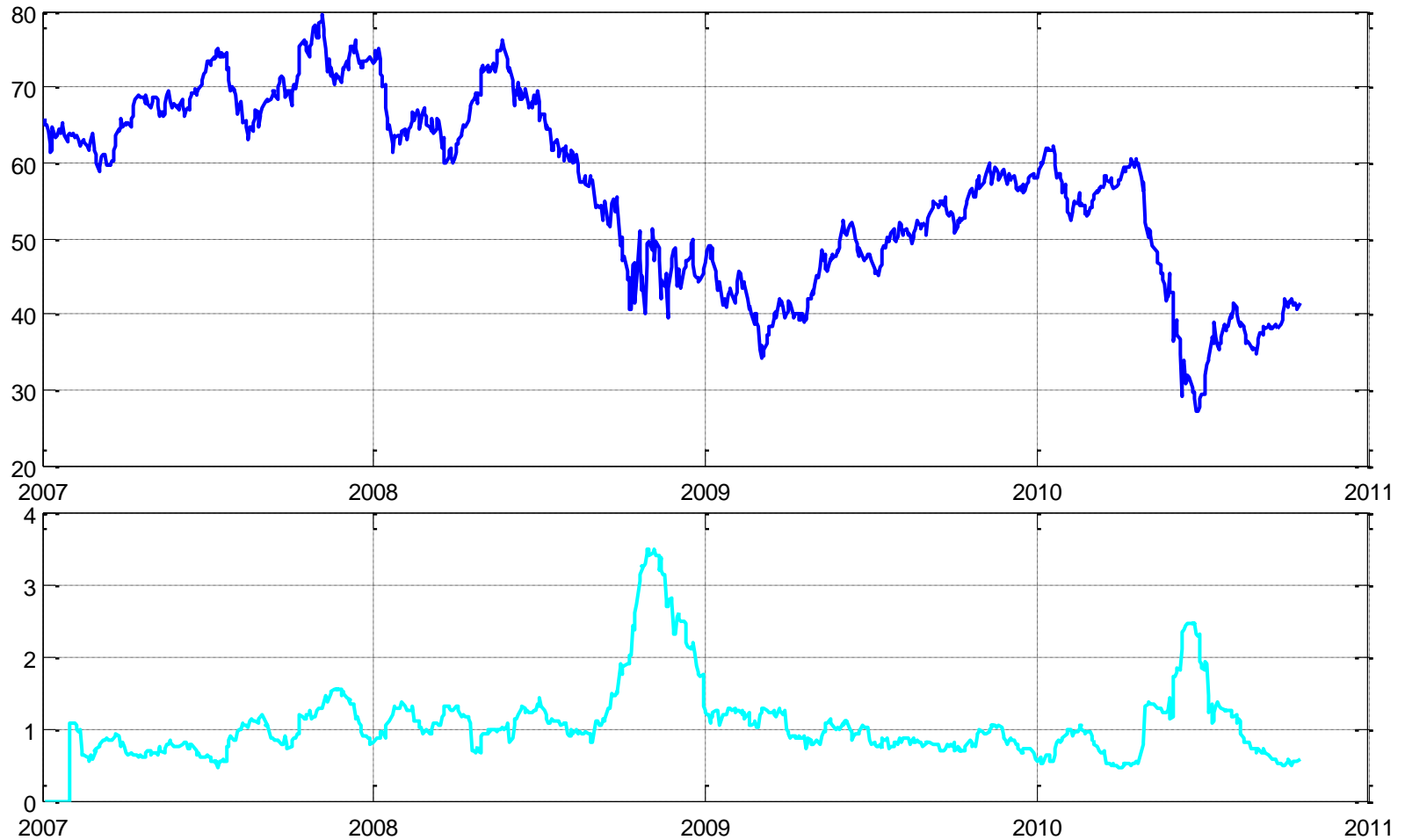
ZIGZAG



Kintamumo indikatoriai

- Moving STD
- Average True Range – įtraukia tarpus
- Chaikin Volatility – tik high-low skirtumas
- ABS return – gražos absoliutinė reikšmė
- Bollinger bands

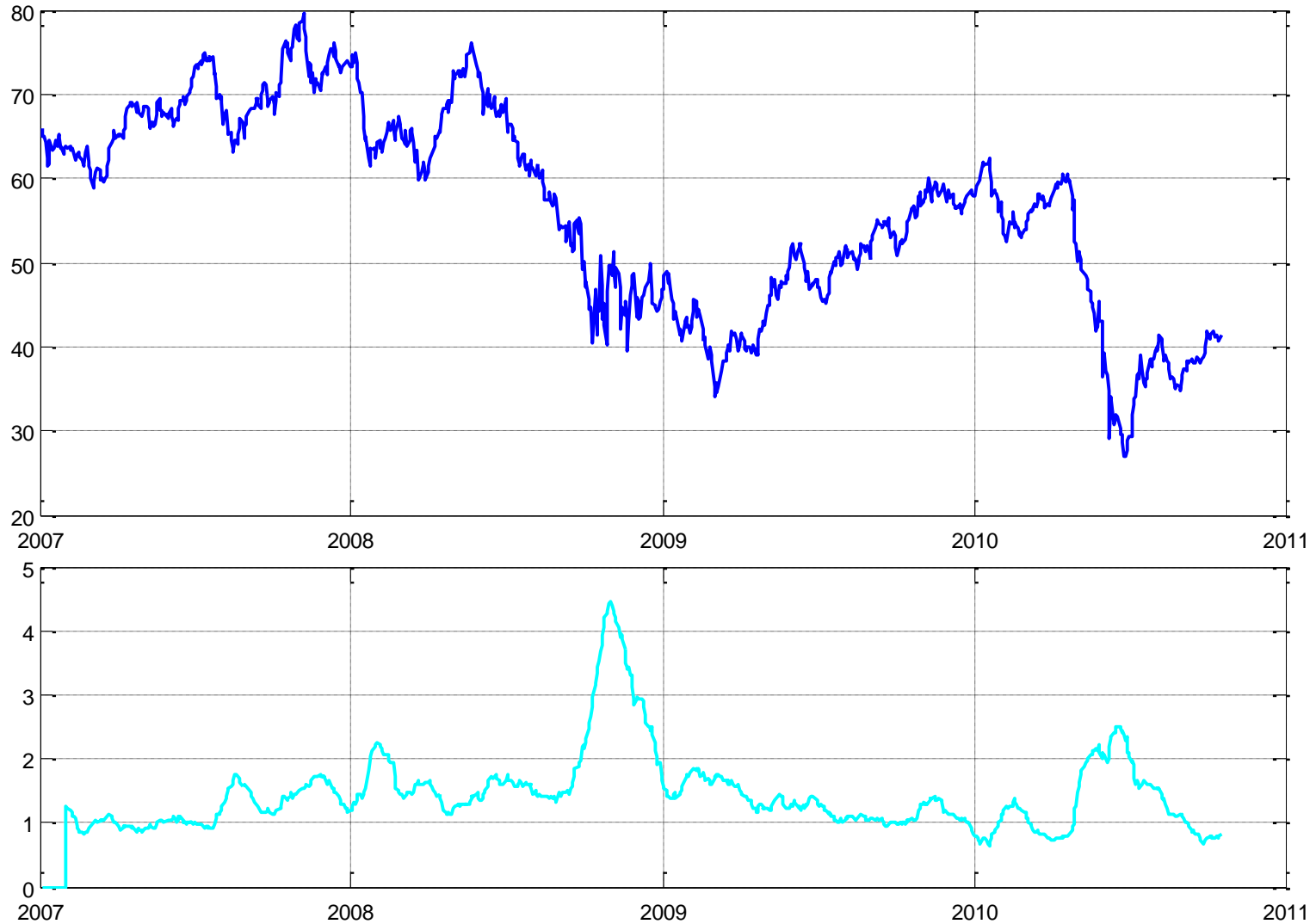
BP MSTD 21



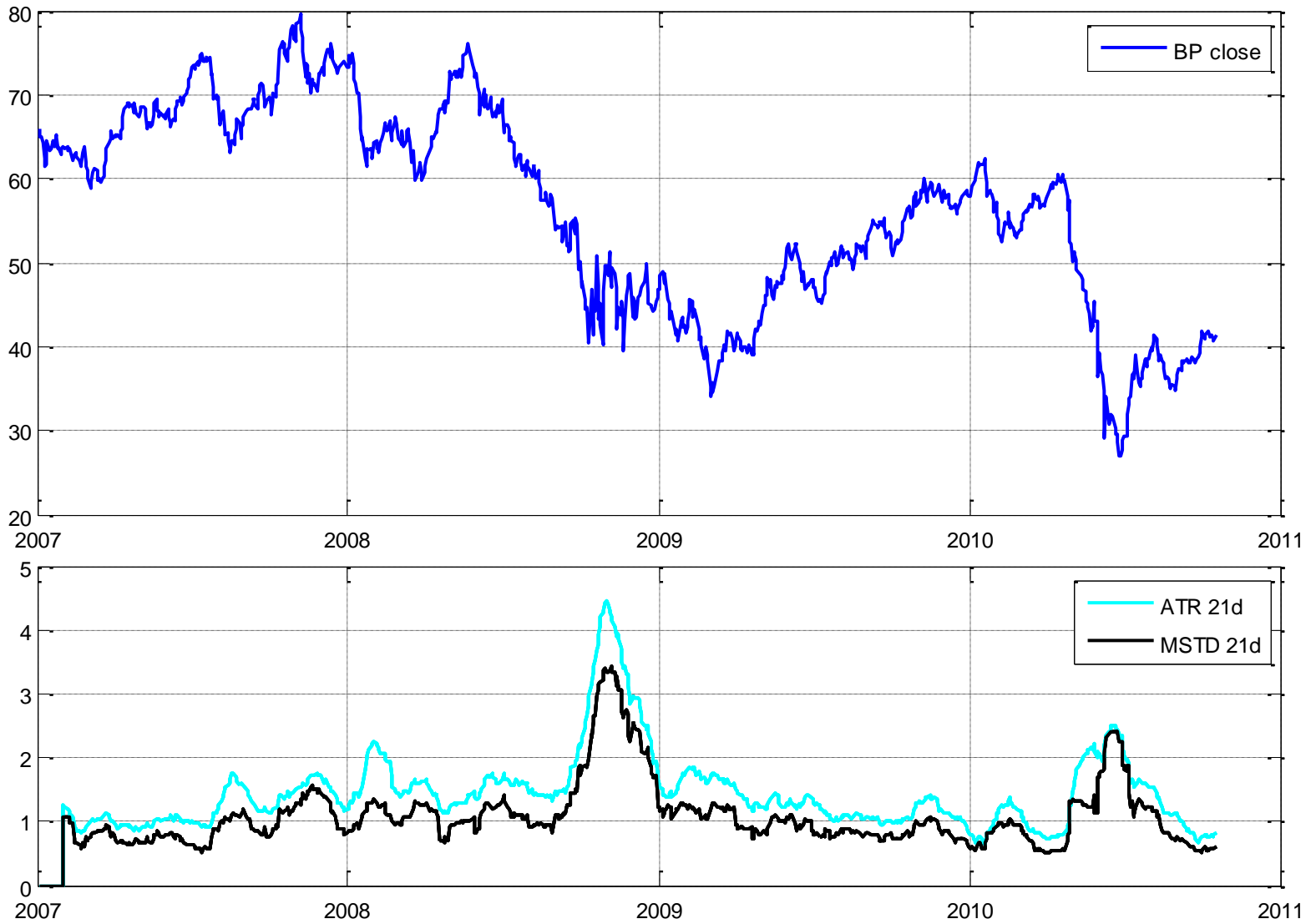
```
p=21; ln = length(pnl); m = zeros(1,ln);  
for i=p:ln  
    m(i) = std(pnl(i-p+1:i));  
end
```

Average True Range

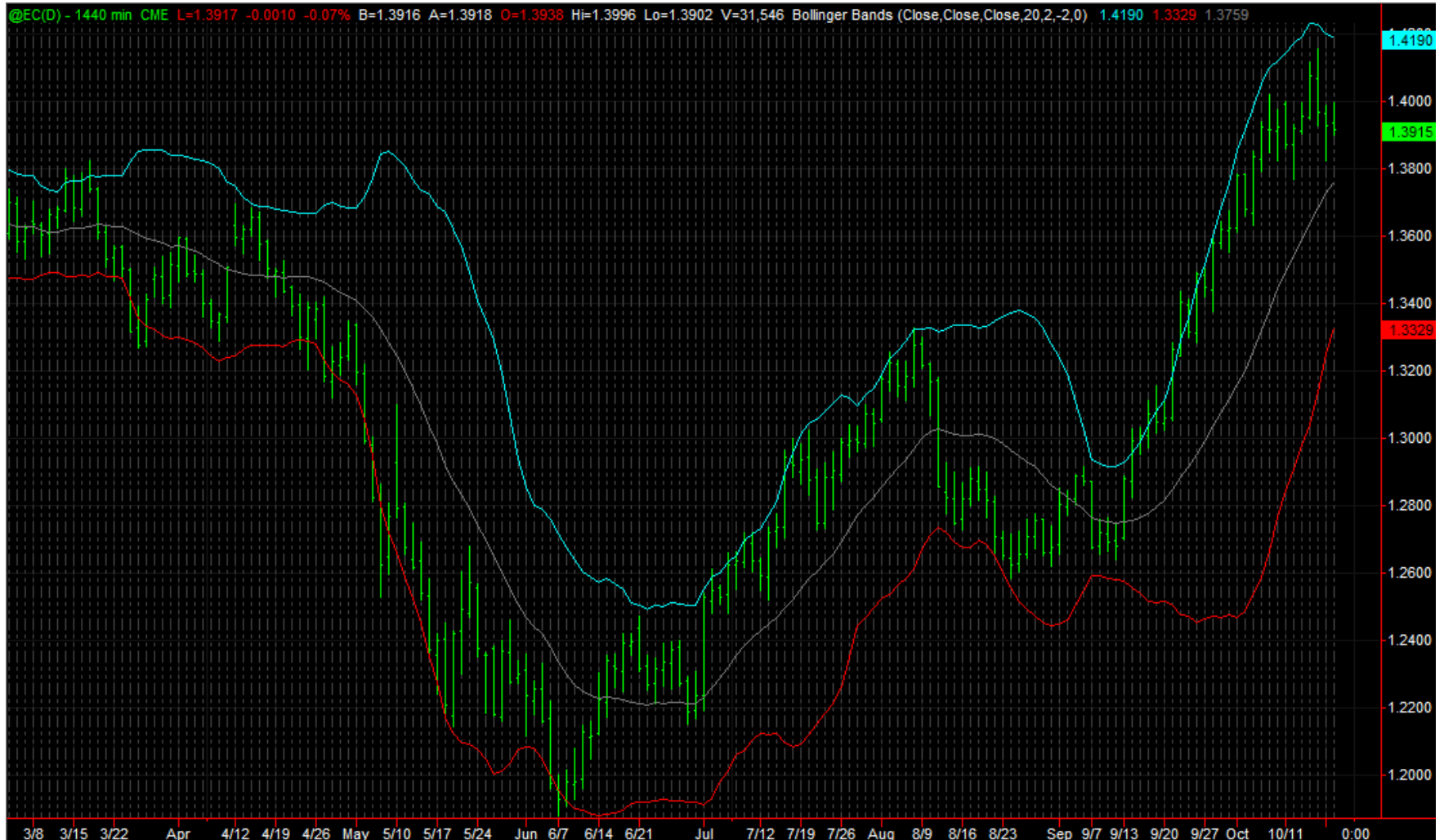
BP ATR 21



BP ATR vs MSTD



Bollinger bands



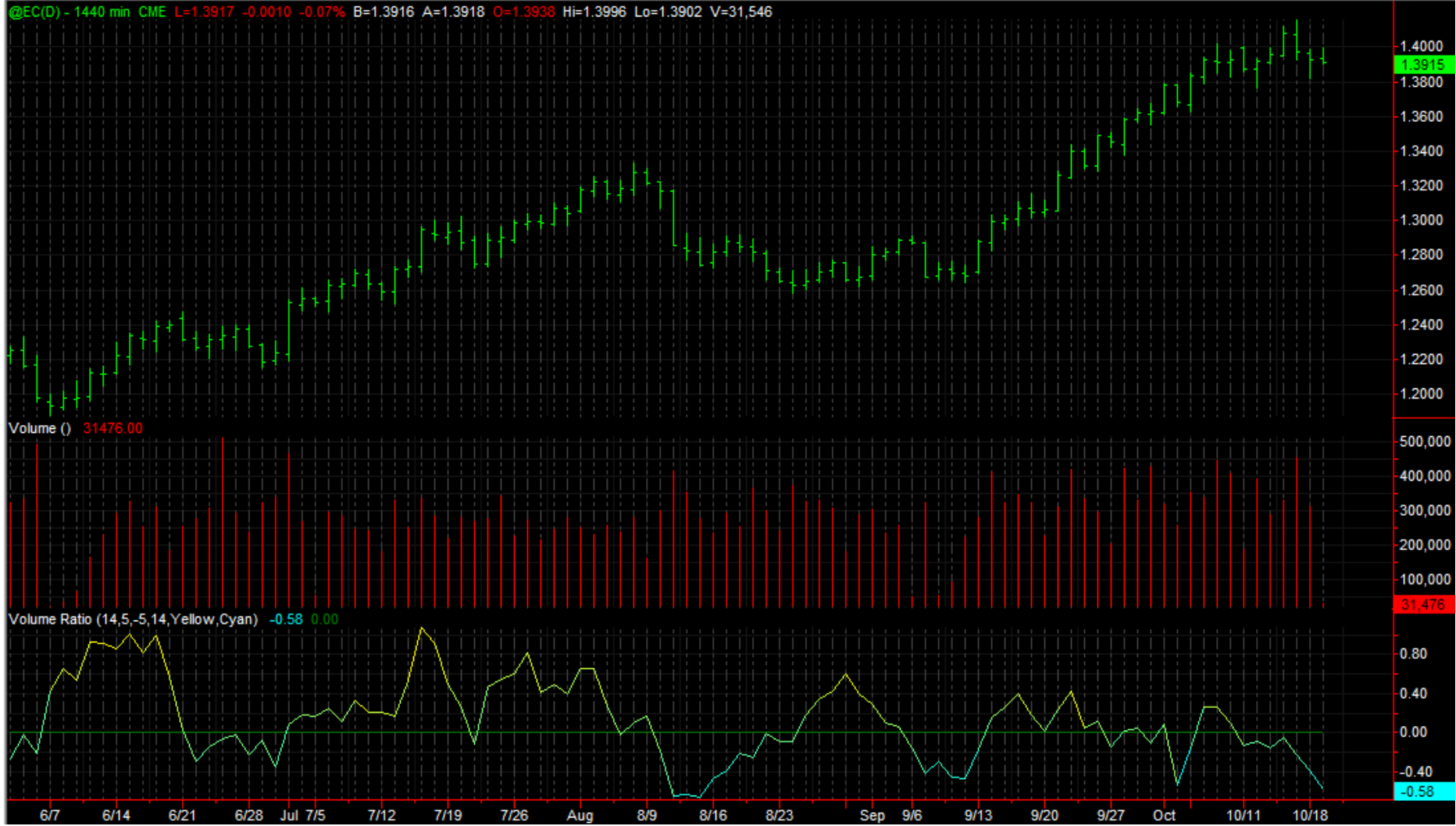
Moving Average Envelopes

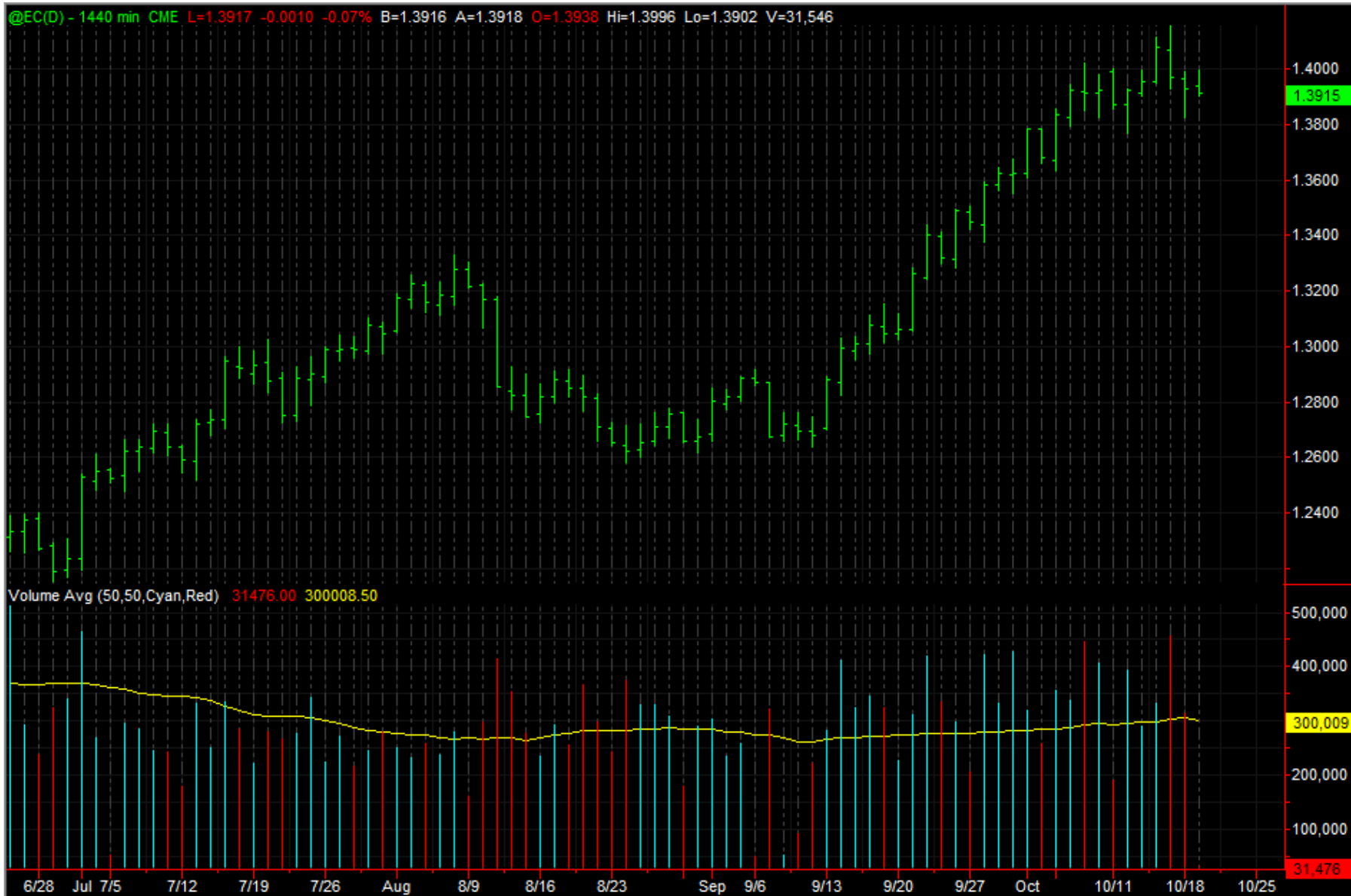


Apyvartos indikatoriai

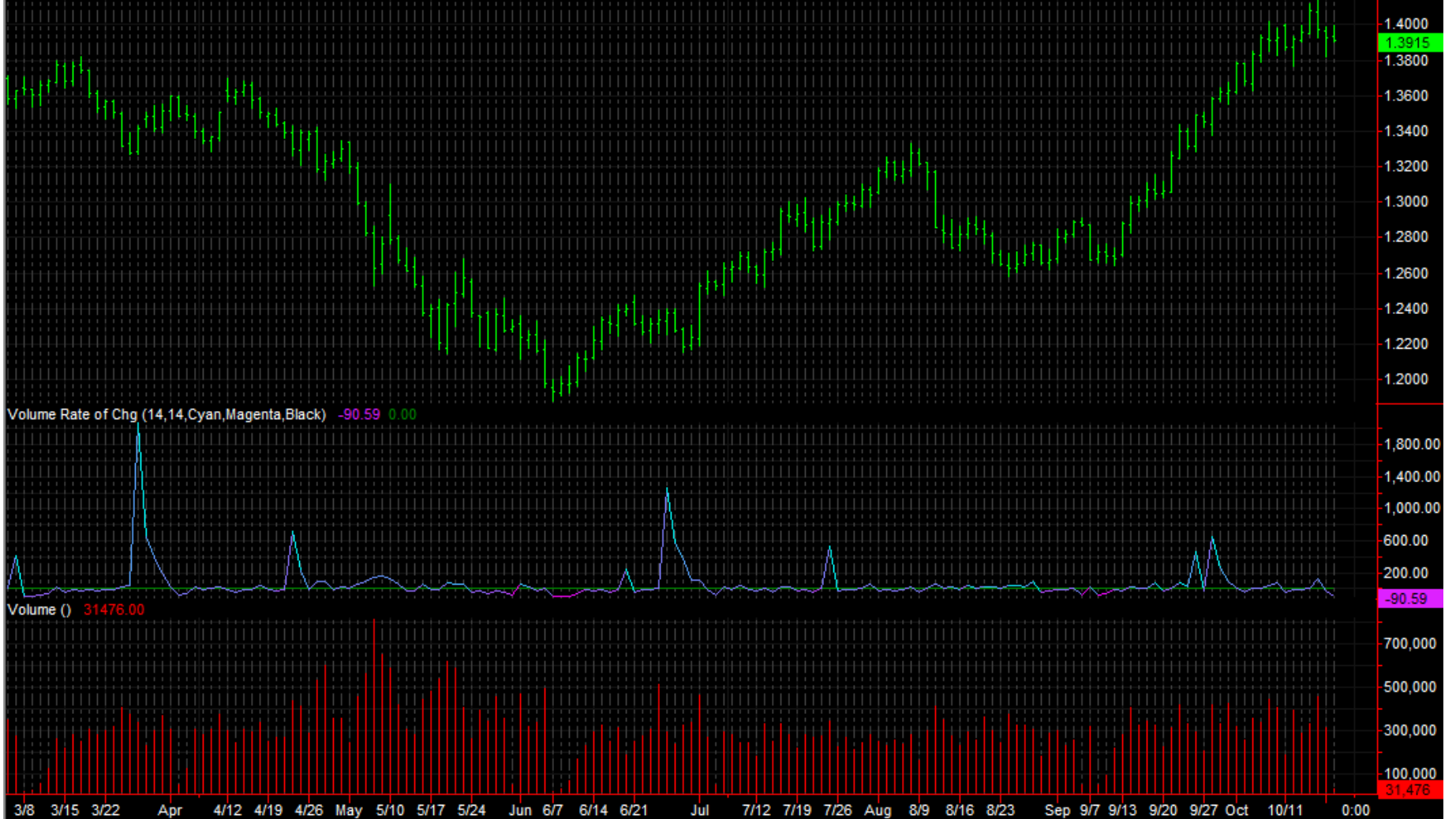
- Volume – tiesiog pati apyvarta
- Volume Rate of Change
- Average Volume

- Kam naudinga apyvartos informacija ?

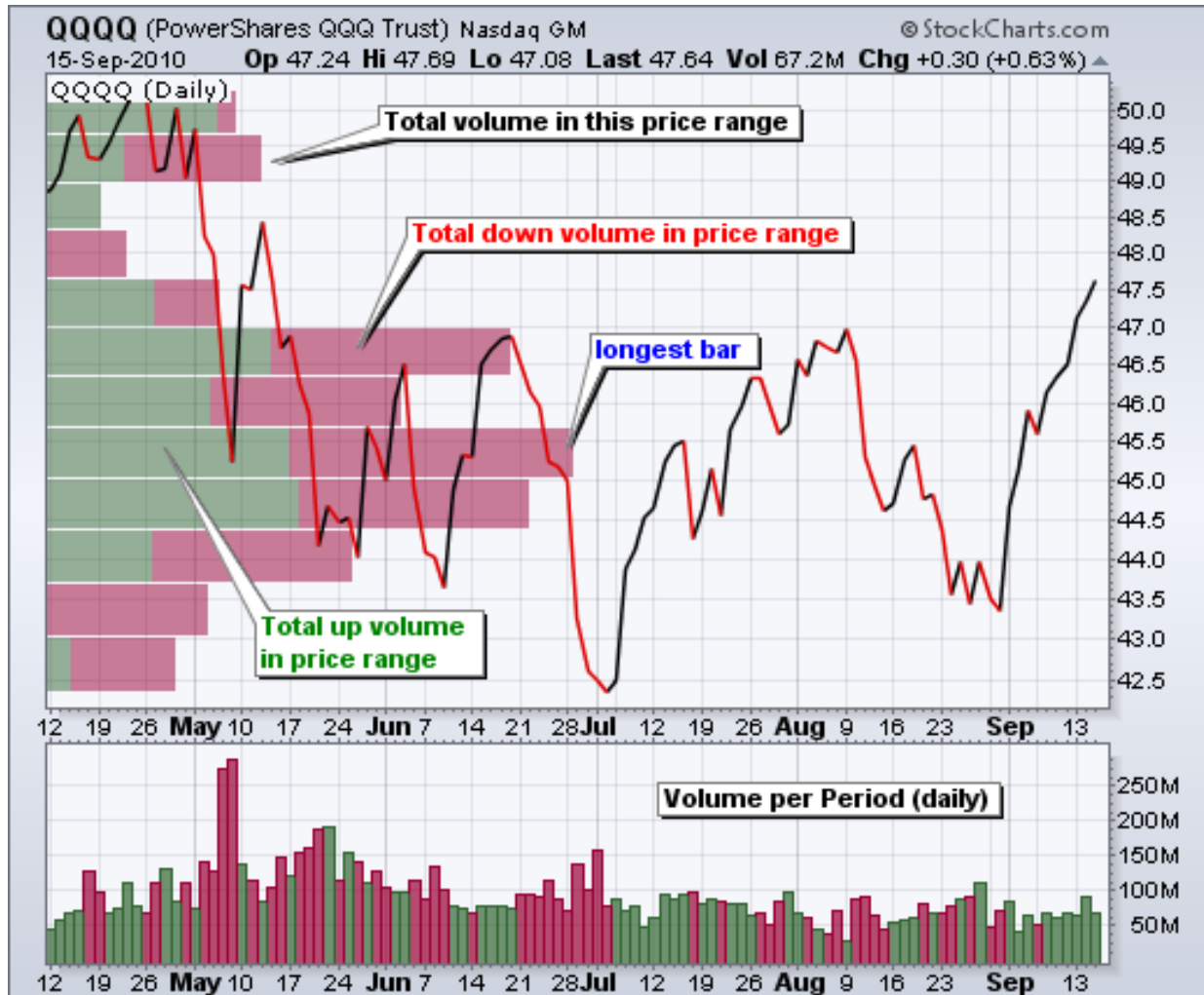




@EC(D) - 1440 min CME L=1.3917 -0.0010 -0.07% B=1.3916 A=1.3918 O=1.3938 Hi=1.3996 Lo=1.3902 V=31,546

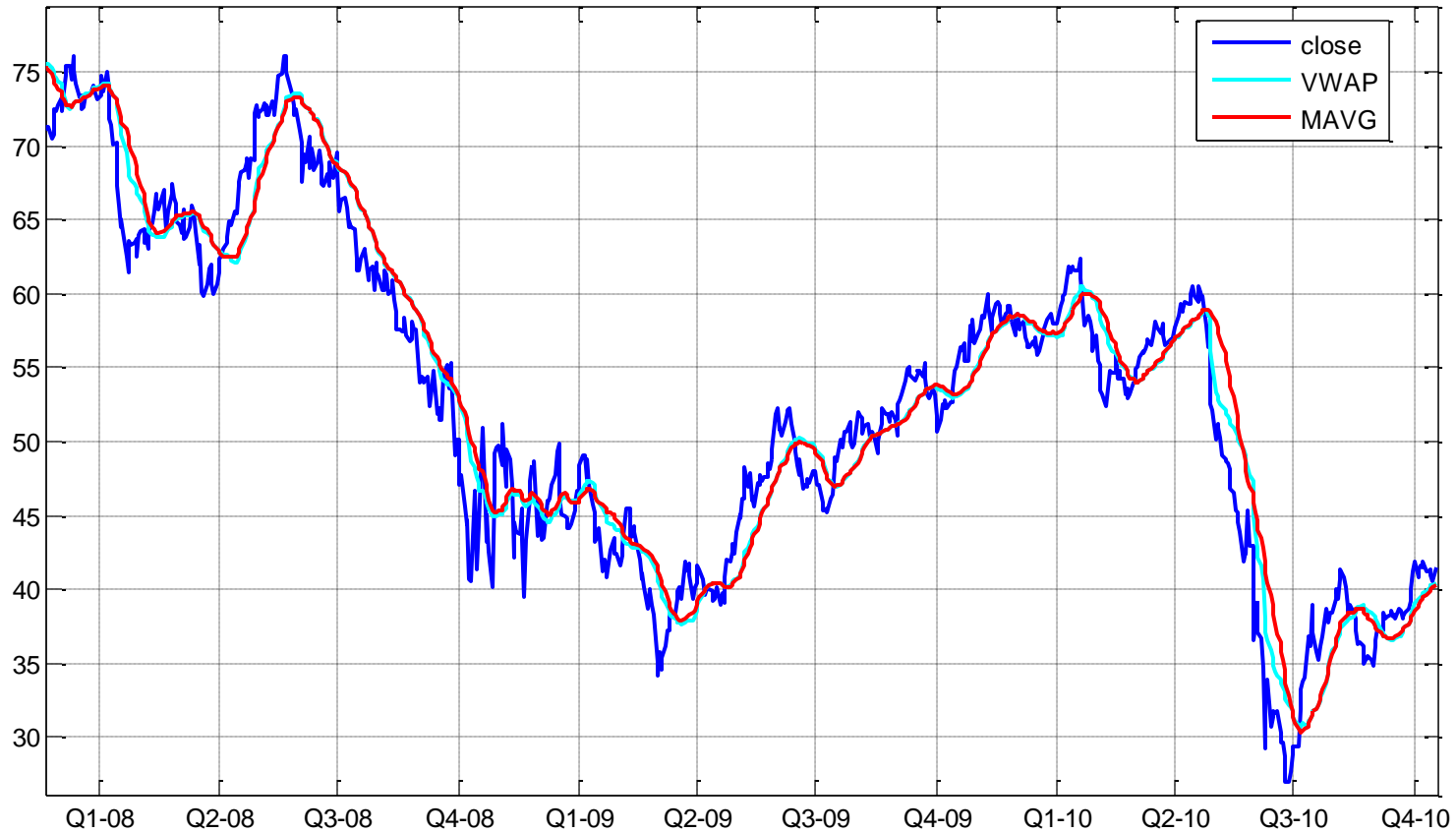


Volume by Price



Kombinuoti indikatoriai

- Kombinuojant kainą ir apyvartą, galima gauti naudingos informacijos
- VWAP



```

p=21; c = d1.close; v = d1.volume;
ln = length(c);
m = zeros(1,ln);
for i=p:ln
    idx = i-p+1:i;
    m(i) = sum(c(idx) .* v(idx)) ./ sum(v(idx));
end

```


Daugybė kity

- [Accumulation Distribution Line](#) - Combines price and volume to show how money may be flowing into or out of a stock.
- [Aroon](#) - Shows whether a stock is trending or oscillating.
- [Average Directional Index \(ADX\)](#) - Shows whether a stock is trending or oscillating.
- [Average True Range \(ATR\)](#) - Measures a stock's volatility.
- [BandWidth](#) - Shows the percentage difference between the upper and lower Bollinger Band.
- [%B Indicator](#) - Shows the relationship between price and standard deviation bands.
- [Commodity Channel Index \(CCI\)](#) - Shows a stock's variation from its 'typical' price.
- [Coppock Curve](#) - An oscillator that uses rate-of-change and a weighted moving average to measure momentum.
- [Correlation Coefficient](#) - Shows the degree of correlation between two securities over a given time frame.
- [Chaikin Money Flow](#) - Combines price and volume to show how money may be flowing into or out of a stock. Alternative to Accumulation/Distribution Line.
- [Chaikin Oscillator](#) - Combines price and volume to show how money may be flowing into or out of a stock. Based on Accumulation/Distribution Line.
- [Detrended Price Oscillator \(DPO\)](#) - A price oscillator that uses a displaced moving average to identify cycles.
- [Ease of Movement \(EMV\)](#) - An indicator that compares volume and price to identify significant moves.
- [Force Index](#) - A simple price-and-volume oscillator.
- [Know Sure Thing \(KST\)](#) - An indicator that measures momentum in a smooth fashion.
- [Mass Index](#) - An indicator that identifies reversals when the price range widens.
- [MACD](#) - A momentum oscillator based on the difference between two EMAs.
- [MACD-Histogram](#) - A momentum oscillator that shows the difference between MACD and its signal line.
- [Money Flow Index \(MFI\)](#) - A volume-weighted version of RSI that shows shifts in buying and selling pressure.
- [Negative Volume Index \(NVI\)](#) - A cumulative volume-based indicator used to identify trend reversals.
- [On Balance Volume \(OBV\)](#) - Combines price and volume in a very simple way to show how money may be flowing into or out of a stock.
- [Percentage Price Oscillator \(PPO\)](#) - A percentage-based version of the MACD indicator.
- [Percentage Volume Oscillator](#) - The PPO indicator applied to volume instead of price.
- [Price Relative](#) - Technical indicator that compares the performance of two stocks to each other by dividing their price data.
- [Rate of Change \(ROC\)](#) - Shows the speed at which a stock's price is changing.
- [Relative Strength Index \(RSI\)](#) - Shows how strongly a stock is moving in its current direction.
- [StockCharts Technical Ranks \(SCTRs\)](#) - Our relative ranking system based on a stock's technical strength.
- [Slope](#) - Measures the rise-over-run for a linear regression
- [Standard Deviation \(Volatility\)](#) - A statistical measure of a stock's volatility.
- [Stochastic Oscillator](#) - Shows how a stock's price is doing relative to past movements. Fast, Slow and Full Stochastics are explained.
- [StochRSI](#) - Combines Stochastics with the RSI indicator. Helps you see RSI changes more clearly.
- [TRIX](#) - A triple-smoothed moving average of price movements.
- [True Strength Index \(TSI\)](#) - An indicator that measures trend direction and identifies overbought/oversold levels.
- [Ulcer Index](#) - An indicator designed to measure market risk or volatility.
- [Ultimate Oscillator](#) - Combines long-term, mid-term and short-term moving averages into one number.
- [Vortex Indicator](#) - An indicator designed to identify the start of a new trend and define the current trend.
- [William %R](#) - Uses Stochastics to determine overbought and oversold levels.

Rinkos indikatoriai

(Market Indicators)

Išskaičiuojami iš rinkos – keleto instrumentų. PVZ. kiek akcijų paisėkė savo high vakar.

- [Arms Index \(TRIN\)](#) - A breadth indicator derived from the AD Ratio and AD Volume Ratio.
- [Advance-Decline Line](#) - A cumulative breadth indicator derived from Net Advances.
- [Advance-Decline Volume Line](#) - A cumulative breadth indicator derived from Net Advancing Volume.
- [Bullish Percent Index](#) - A breadth indicator derived from the percentage of stocks on PnF buy signals.
- [High-Low Index](#) - A breadth indicator that shows new highs as a percentage of new highs plus new lows.
- [McClellan Oscillator](#) - A MACD type oscillator of Net Advances.
- [McClellan Summation Index](#) - A cumulative indicator based on the McClellan Oscillator.
- [Net New Highs](#) - A breadth indicator showing the difference between new highs and new lows. Percentage, cumulative and smoothed versions can be used.
- [Percent Above Moving Average](#) - A breadth oscillator that measure the percentage of stocks above a specific moving average.
- [Record High Percent](#) - A 10-day moving average of the High-Low Index, which is a breadth indicator.
- [Volatility Index](#) - A indicator of implied volatility designed to measure fear and complacency.

Pabaiga