Technical Indicators and Applications

Doruk Çetin
Bahar Aydemir
Technical Indicator

“Mathematical formulas on a time series data to produce another time series data”

Trend  Momentum  Volatility
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<th>Indicator Name</th>
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<th>Avg Gain, Loss</th>
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Moving Average

- Simple
- Exponential
- Weighted
- Smoothed

\[
SMA = \frac{\text{SUM}(Close, N)}{N}
\]

\[
EMA = (Close \times P) + (EMA(\text{prev}) \times (1 - P))
\]

\[
SMMA = (SMMA(\text{prev}) \times (N - 1) + Close)/N
\]

\[
LWMA = \frac{\text{SUM}(Close \times i, N)}{\text{SUM}(i, N)}
\]
Bollinger Bands

MiddleBand = SMA(Close, 20)

Upper Band = SMA(Close, 20) + SD(Close, 20) * 2

Lower Band = SMA(Close, 20) - SD(Close, 20) * 2
\[ \%b = \frac{Close - Lower BB}{Upper BB - Lower BB} \]
Bollinger Bands

Upper Band
+2 Standard Deviations

20-day SMA

Lower Band
-2 Standard Deviations

Bollinger Bands Shrinking in Width
Volatility Shrinking, Stock Price Resting

Daily Chart - Wal-Mart (WMT)
RSI

“Relative Strength Index”

\[ \text{AverageGain} = \frac{((\text{AverageGain(prev)} \times 13 + \text{Gain})}{14} \]

\[ \text{AverageLoss} = \frac{((\text{AverageLoss(prev)} \times 13 + \text{Loss})}{14} \]

\[ RS = \frac{\text{AverageGain}}{\text{AverageLoss}} \]

\[ RSI = 100 - \frac{100}{(1 + RS)} \]
Relative Strength Index (RSI)

Daily Chart - 100 oz. Gold (ZG)

- Overbought (70)
- Oversold (30)

Buy: RSI (14-day) below 30

Sell: RSI (14-day) above 70

RSI (5-day) and Buy signals:

- Buy when RSI (5-day) crosses above 30
- Buy when RSI (5-day) crosses above RSI (14-day)

RSI (5-day) and Sell signals:

- Sell when RSI (5-day) crosses below 30
- Sell when RSI (5-day) crosses below RSI (14-day)