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TECHNICAL ANALYSIS OF STOCKS & COMMODITIES™

JANUARY 2026

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Identifying Peaks And Valleys In Ranging Markets

The Reversion Index

The reversion index can provide timely buy and sell signals for reversion-to-the-mean strategies. Find out how to calculate and plot it.

by John F. Ehlers

The basic idea of the *reversion index* is simple: It is the short-term sum of the bar-to-bar price differences normalized to the sum of the absolute values of those price differences. In an ideal world, the reversion index swings from –1 to +1.

I came up with the idea for this indicator after developing the *continuation index*, which I presented in the September 2025 issue. The continuation index, based on the Laguerre filter, can provide timely indication of trend onset, trend continuation, and trend exhaustion.

Following that research, it occurred to me that if the continuation index is a good indicator of trend and proved useful in trend trading, what about mean-reversion trading? Why not try to create an indicator useful for mean-reversion trading? So I put one together and I will present it here.

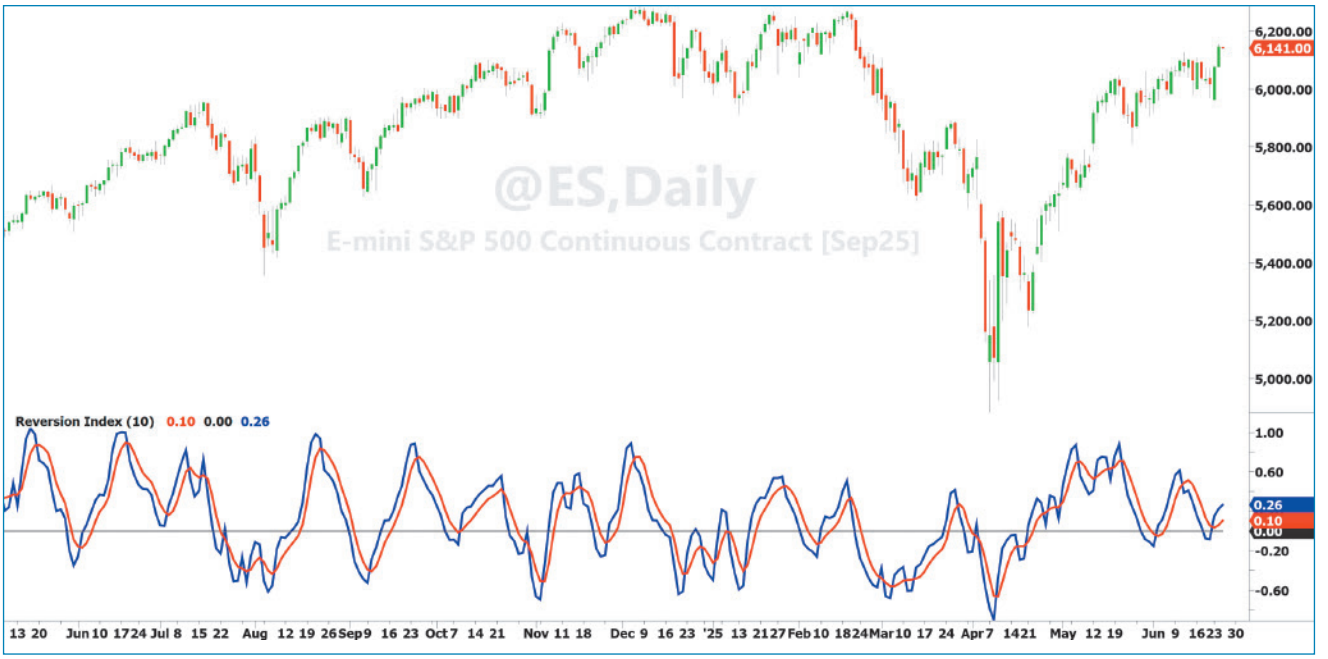
A REPRESENTATION OF SWINGS IN THE DATA

From a mathematical perspective, the sample-to-sample differences in sampled data is analogous to *differentiation* in calculus. The short-term sum of those differences is analogous to *integration* in calculus. Since the opposite operations of differentiation and integration are employed, the operations cancel each other, and the result is that the reversion index is an accurate representation of price movement.

From a cycles perspective, the summation is maximum during the upswing segment of the cycle period. But the sum is referenced to the right-hand side of the data window, which lags the middle of that window by 90 degrees. The result is the same.

The peak of the reversion index occurs at the peak swing in the data. Similarly, the valley of the reversion index occurs at the cycle valley of the data. The ideal length of the data window is half the cycle period of the data so that the summation is conducted over the range from the cycle valley to the cycle peak. For example, you expect a monthly cycle (20 trading days) in the stock indexes, so you would select a summation period of 10 in this case.

AUN PUTTIPONG/SHUTTERSTOCK



TRADESTATION

FIGURE 1: REVERSION INDEX. The reversion index is demonstrated here using a data window length of 10 on approximately one year of emini S&P futures data. The reversion index consists of two SuperSmoothers of different calculation lengths that smooth the initial reversion index calculation. Peaks and valleys in the price data are identified by crossings of the two SuperSmoother plot lines. The crossings can provide timely buy and sell short (or sell to exit) trading signals.

Of course, if the summation is conducted over a large number of samples, the index fails to identify the cyclic peaks and valleys. Rather, it can be described as an estimate of the trend over the longer period. That is not the intended use of the reversion index.

ADDING THE SUPERSMOOTHER FILTER

Since a short data window is used, the normalized sum of price differences is very irregular, making identification of the peaks and valleys difficult. For example, using the zero rate of change to sense the peaks and valleys is out of the question. The solution is to further smooth the summation with two SuperSmoother filters having different calculation lengths.

Since the lag of the filters are proportional to their calculation lengths, the two filter plots cross almost exactly at the peaks and valleys in the price data. The suggested lengths of the SuperSmoother filters are 4

REVERSION INDEX, IN EASYLANGUAGE CODE

The *reversion index* is calculated as the sum of the bar-to-bar price differences over a short data window, normalized to the sum of the absolute values of those price differences. The reversion index can swing between –1 and +1.

```
{
    Reversion Index
    (C) 2025   John F. Ehlers
}

Inputs:
      Length(20);

Vars:
      DeltaSum(0),
      AbsDeltaSum(0),
      count(0),
      Ratio(0),
      Smooth(0),
      Trigger(0);

DeltaSum = 0;
AbsDeltaSum = 0;
For count = 0 to Length - 1 Begin
      DeltaSum = DeltaSum + Close[count] - Close[count +
1];
      AbsDeltaSum = AbsDeltaSum + AbsValue(Close[count]
- Close[count + 1]);
End;

If AbsDeltaSum <> 0 Then Ratio = DeltaSum / AbsDelta-
Sum;
Smooth = $SuperSmoother(Ratio, 8);
Trigger = $SuperSmoother(Ratio, 4);

Plot1(Smooth);
Plot2(0);
Plot3(Trigger);
```

SUPERSMOOTHER FUNCTION, IN EASYLANGUAGE CODE

To make the normalized summation of price differences less erratic and to make identification of peaks and valleys easier, the summation is further smoothed with two SuperSmoother filters of different calculation lengths. The suggested lengths of the SuperSmoother filters for this use are 4 bars and 8 bars.

```
{
   $SuperSmoother Function
   (C) 2025  John F. Ehlers
}

Inputs:
      Price(numericseries),
      Period(numericsimple);

Vars:
      a0(0),
      Q(0),
      c1(0),
      c2(0);

Q = expvalue(-1.414*3.14159 / Period);
c1 = 2*Q*Cosine(1.414*180 / Period);
c2 = Q*Q;
a0 = (1 - c1 + c2) / 2;

If CurrentBar >= 4 Then $SuperSmoother = a0*(Price +
Price[1]) + c1*$SuperSmoother[1] - c2*$SuperSmoother[2];
If Currentbar < 4 Then $SuperSmoother = Price;
```

bars and 8 bars.

The reversion index using a data window length of 10 is shown in Figure 1 on approximately one year of emini S&P futures data. The SuperSmoother crossings beyond thresholds of, say, +/– 0.3 provide excellent buy and sell short (or sell to exit) trading signals.

EasyLanguage code for the reversion index is given in the sidebar, "Reversion Index, In EasyLanguage Code, and code for the SuperSmoother function is given in the sidebar, "SuperSmoother Function, In EasyLanguage Code."

IN A NUTSHELL

The reversion index provides timely buy and sell signals for reversion-to-the-mean types of strategies. It is computed as the summation of bar-to-bar price differences normalized to the summation of the absolute amplitudes of those differences. The summation is conducted over approximately half the period of the dominant cycle contained within the data. Identification of the peaks and valleys is accomplished by the crossings of two SuperSmoothers having different calculation lengths.

John Ehlers is a retired electrical engineer and a retired technical analyst, specializing in the application of DSP (digital signal processing) to trading. His latest book is Cybernetic Trading Indicators *(2025), which presents and updates the market analysis techniques he developed over four decades of trading. For more information, see www.mesasoftware.com.*

Identification of the peaks and valleys is accomplished by the crossings of two SuperSmoothers.

FURTHER READING

Ehlers, John [2025]. *Cybernetic Trading Indicators*, Amazon.

_____ [2004]. *Cybernetic Analysis For Stocks And Futures*, John Wiley & Sons.

_____ [2013]. *Cycle Analytics For Traders*, John Wiley & Sons.

_____ [2025]. "The Continuation Index: Trend Onset And Trend Exhaustion," *Technical Analysis of* STOCKS & COMMODITIES, Volume 43: September.

‡TradeStation

‡See Editorial Resource Index

The code given in this article is available in the ***Article Code*** *section of our website, Traders.com.*

See our ***Traders' Tips*** *section of the magazine beginning on page 52 for implementation of John Ehlers' technique to various technical analysis programs and trading platforms. Code found in the Traders' Tips section is also posted to Traders.com.*

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TRADERS' TIPS

Continued from page 56

```
tor())
   ax2.xaxis.set_major_formatter(mdates.
ConciseDateFormatter(mdates.AutoDateLoca-
tor()))
   plt.setp(ax2.get_xticklabels(), rotation=0,
ha='center')  # horizontal, centered

   #plt.xlabel('Date')
   plt.tight_layout()
   plt.show()

# Call functions to run required calculations. Set
buy when ReversionTrigger
# swings above ReversionSmooth and sell for
when ReversionTrigger swings below.
# Different period and lengths can be tested to
determine optimum settings.
# Top plot close vs the SuperSmoother and red
and white background shading to
# show highlight when buy and sell signals are
active. Using slicing to plot
# last 1 year (aka 252 trading days).

df = ohlcv.copy()
df['SuperSmoother'] = super_
smoother(df['Close'], period=10)
df = df.join(reversion_index(df['Close'],
length=20))
df['Signal'] = np.where(df['ReversionTrigger'] >
df['ReversionSmooth'], 1, -1)
plot_reversion_index(df[-252:])
```

—Rajeev Jain
jainraje@yahoo.com

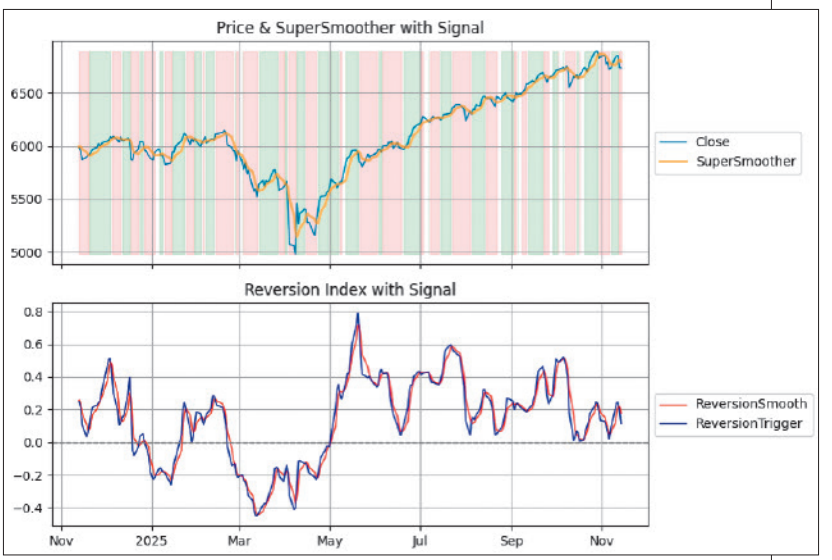


FIGURE 6: PYTHON. The SuperSmoother is plotted along with price. The red and green vertical shading highlights when buy and sell signals are active (top). The reversion index and its smoothed version are demonstrated (bottom).

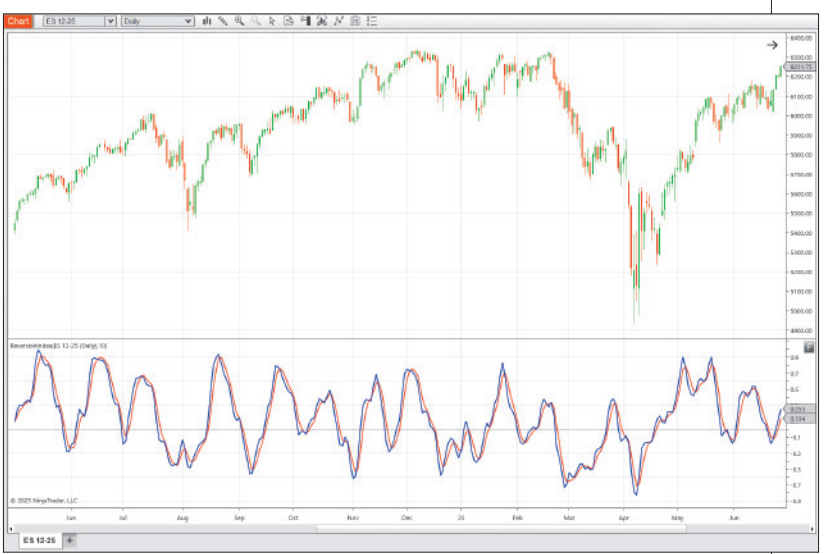


FIGURE 7: NINJATRADER. The reversion index is demonstrated on a daily chart of emini S&P 500 futures (ES) over about a one-year period.

NINJATRADER®

✦ NINJATRADER: JANUARY 2026 TRADERS' TIPS CODE

In "The Reversion Index (Identifying Peaks And Valleys In Ranging Markets)" in this issue, John Ehlers introduces an indicator he designed for use with mean-reversion strategies.

The indicator is available for download at the following link for NinjaTrader 8:

NinjaTrader 8: ninjatrader.com/SC/January2026SCNT8.zip

Once the file is downloaded, you can import it into NinjaTrader 8 from within the control center by selecting Tools → Import → NinjaScript Add-On and then selecting the downloaded file for NinjaTrader 8.

You can review the source code in NinjaTrader 8 by selecting New → NinjaScript Editor → Indicators from within the control center window and selecting the file.

A sample chart is shown in Figure 7.

NinjaScript uses compiled DLLs that run native, not interpreted, to provide you with the highest performance possible.

—Helom
NinjaTrader, LLC
www.ninjatrader.com

Find similar articles online at Traders.com

The focus of Traders' Tips this month is John F. Ehlers' article in this issue, "The Reversion Index." Here, we present the January 2026 Traders' Tips code with possible implementations in various software.

The code for the following Traders' Tips selections is posted here:

• Traders.com → S&C Magazine → **Traders' Tips**

At Traders.com you can also right-click on any chart to open it in a new tab or window and view the chart at a much larger size.

The Traders' Tips section is provided to help readers implement a selected technique from an article in this issue or another recent issue. The entries here are contributed by software developers or programmers for software that is capable of customization.

TradeStation

✦ TRADESTATION: JANUARY 2026 TRADERS' TIPS CODE

In John Ehlers' article in this issue, "The Reversion Index," he presents an indicator that produces timely buy and sell signals for mean-reversion strategies by summing bar-to-bar price changes and normalizing them by their absolute values. He explains that the summation should cover about half of the dominant cycle in the data, and that peaks and valleys are identified by the crossings of two SuperSmoother filters with different lengths. The reversion index is a normalized sum of price differences that oscillates between -1 and +1.

EasyLanguage code for the reversion index is shown here. A sample chart of the reversion index is shown in Figure 1.

Indicator: Reversion Index

```
{
      TASC APR 2026
      Reversion Index
      (C) 2005 John F. Ehlers
}

inputs:
      Length( 20 );

variables:
      DeltaSum( 0 ),
      AbsDeltaSum( 0 ),
      Count( 0 ),
      Ratio( 0 ),
      Smooth( 0 ),
      Trigger( 0 );

DeltaSum = 0;
AbsDeltaSum = 0;

for Count = 0 to Length - 1
begin
      DeltaSum = DeltaSum + Close[Count] - Close[Count + 1];
      AbsDeltaSum = AbsDeltaSum + AbsValue( Close[Count]
       - Close[Count + 1] );
end;

if AbsDeltaSum <> 0 then
      Ratio = DeltaSum / AbsDeltaSum;

Smooth = $SuperSmoother( Ratio, 8 );
Trigger = $SuperSmoother( Ratio, 4 );

Plot1( Smooth, "Smooth" );
Plot2( 0, "Zero" );
Plot3( Trigger, "Triger" );
```

Function: $SuperSmoother

FIGURE 1: TRADESTATION. This daily chart of the S&P 500 ETF SPY showing a portion of 2025 demonstrates the indicator applied with the length set to 10.

```
{
      SuperSmoother Function
      (C) 2025 John F. Ehlers
}

inputs:
      Price(numericseries),

Period(numericsimple);

variables:
      a1( 0 ),
      b1( 0 ),
      c1( 0 ),
      c2( 0 ),
      c3( 0 );

a1 = ExpValue(-1.414 * 3.14159 / Period);
b1 = 2 * a1 * Cosine(1.414 * 180 / Period);
c2 = b1;
c3 = -a1 * a1;
c1 = 1 - c2 - c3;

if CurrentBar >= 4 then
      $SuperSmoother = c1*(Price + Price[1]) / 2
       + c2 * $SuperSmoother[1] + c3 * $SuperSmoother[2];
if CurrentBar < 4 then
      $SuperSmoother = Price;
```

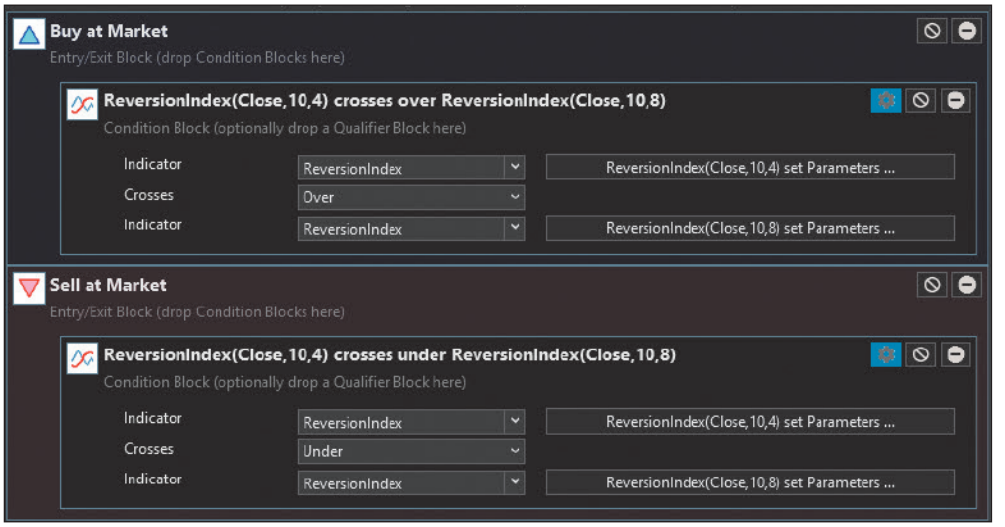


FIGURE 2: WEALTH-LAB. Wealth-Lab's drag-and-drop building block feature is demonstrated to design a trading strategy based on the reversion index oscillator.

FIGURE 3: WEALTH-LAB. The example strategy based on the reversion index is demonstrated on a chart of The Trade Desk (TTD).

This article is for informational purposes. No type of trading or investment recommendation, advice, or strategy is being made, given, or in any manner provided by TradeStation Securities or its affiliates.

—John Robinson
TradeStation Securities, Inc.
www.TradeStation.com

WealthLab.com

✦ WEALTH-LAB: JANUARY 2026 TRADERS' TIPS CODE

We added the reversion index, which is introduced in John Ehlers' article in this issue, to our TASC indicator library in WealthLab 8, so you can use it in drag-and-drop strategy development.

Our implementation has two parameters: a period with a default of 10, and a smoothing factory (internally using the SuperSmoother) with a default of 4.

We used our building block strategy designer to quickly mock up a strategy by dropping the *indicator crosses indicator* condition block onto the buy and sell blocks. (See Figure 2.) We set up the indicators to use the reversion index with a smoothing of 4 crossing over a reversion index with a smoothing of 8 for entries, and crossing under for exits.

Figure 3 demonstrates the strategy applied to The Trade Desk (TTD), showing some representative trades. It appears to work very well on a volatile stock such as this one, capturing the upward moves while protecting from larger drawdowns.

—Dion Kurczek
Wealth-Lab team
www.wealth-lab.com

FIGURE 4: TRADINGVIEW. Here you an example of the reversion index plotted on a chart of emini S&P 500 futures (ES.)

TradingView

✦ TRADINGVIEW: JANUARY 2026 TRADERS' TIPS CODE

The TradingView Pine Script code presented here implements the reversion index as introduced by John Ehlers in his article in this issue, "The Reversion Index (Identifying Peaks And Valleys In Ranging Markets)."

```
// TASC Issue: January 2026
//    Article: Identifying Peaks And Valleys In Ranging Markets
//             The Reversion Index
//  Article By: John F. Ehlers
//    Language: TradingView's Pine Script® v6
// Provided By: PineCoders, for tradingview.com

//@version=6
indicator('TASC 2026.01 The Reversion Index', 'RI', overlay = false)

//#region Inputs

int length = input.int(20)

//#endregion

//#region Functions

//===== Super Smoother Filter =====//
superSmoother(float Series, float Period) =>
   var float ALPHA =  math.pi * math.sqrt(2.0) / Period
   var float BETA  =  math.exp(-ALPHA )
   var float COEF2 = -math.pow(BETA, 2)
   var float COEF1 =  math.cos( ALPHA ) * 2.0 * BETA
   var float COEF0 =  1.0 - COEF1 - COEF2
   float sma2   = math.avg(Series, nz(Series[1], Series))
   float smooth = na, smooth := COEF0 *     sma2     +
                  COEF1 *  nz(smooth[1]) +
                  COEF2 *  nz(smooth[2])

reversionIndex (int length) =>
   float d = close - close[1]
   float ds = math.sum(d, length)
   float ads = math.sum(math.abs(d), length)
   float ratio = ads != 0.0 ? ds / ads : 0.0
   ratio

//#endregion

//#region Calculations

float ri = reversionIndex(length)
float sm = superSmoother(ri, 8)
float tr = superSmoother(ri, 4)

//#endregion

//#region Display

hline(0)
plot(ri, 'RI', color.gray)
plot(sm, 'Smooth', color.blue)
plot(tr, 'Trigger', color.red)

//#endregion
```

The indicator is available on TradingView from the PineCodersTASC account at: https://www.tradingview.com/u/PineCodersTASC/#published-scripts

An example chart is shown in Figure 4.

—PineCoders, for TradingView
www.TradingView.com

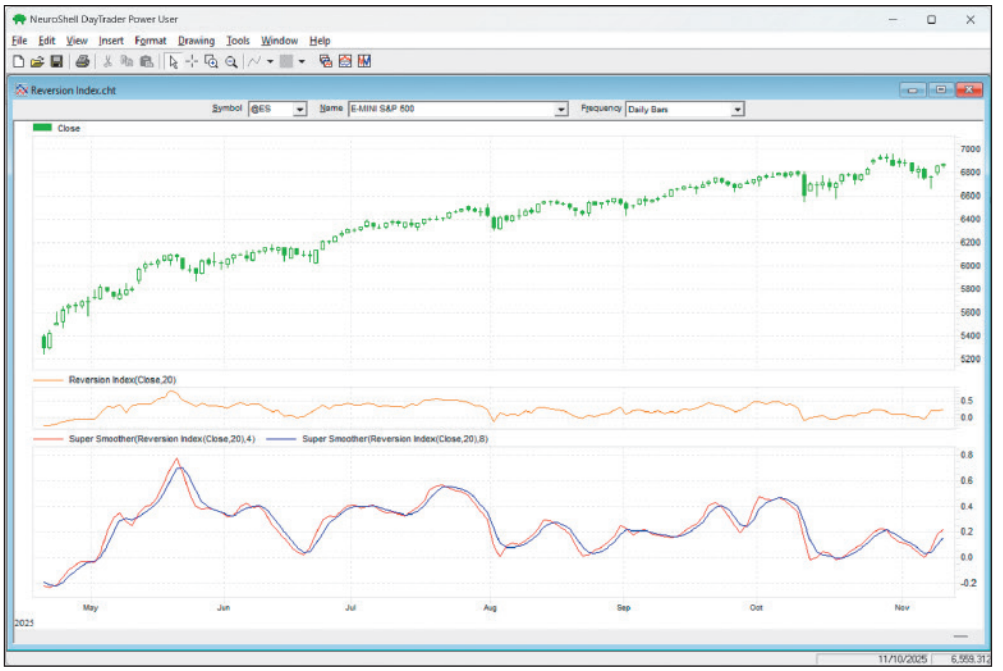


FIGURE 5: NEUROSHELL TRADER. This NeuroShell Trader chart demonstrates the reversion index on a chart of emini S&P 500 futures (ES) along with its SuperSmoother filtered version.

✦ NEUROSHELL TRADER: JANUARY 2026 TRADERS' TIPS CODE

The reversion index introduced in John Ehlers' article in this issue can be easily implemented in NeuroShell Trader by selecting *new indicator* from the *insert* menu and using the indicator wizard to create the following indicators:

```
Reversion index:
Divide(Sum(Momentum(Close,1),20),Sum(Abs(Moment
um(Close,1)),20))

Smoothed:
Super Smoother( Reversion Index, 4)
Super Smoother( Reversion Index, 8)
```

Note that the SuperSmoother indicator being used here was created and described in earlier Traders' Tips (such as in the June 2025 and May 2021 issues). Users of NeuroShell Trader can go to the STOCKS & COMMODITIES section of the NeuroShell Trader free technical support website to download a copy of this or any previous Traders' Tips.

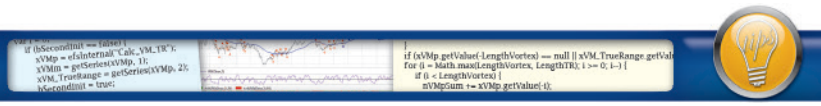
—Ward Systems Group, Inc.
sales@wardsystems.com
www.neuroshell.com

✦ PYTHON: JANUARY 2026 TRADERS' TIPS CODE

Following is Python code to implement concepts described in John Ehlers' article in this issue, "The Reversion Index."

The top plot in Figure 6 shows an example of the SuperSmoother and its signals superimposed on price; the red and green vertical shading highlights when buy and sell signals are active. The bottom chart plots the reversion index along with its smoothed version.

```
"""
Written By: Rajeev Jain, jainraje@yahoo.com

Python code to implement concepts in Technical Analysis of S&C Magazine
January 2026 article "The Reversion Index" by John F Ehlers. This python code is provided for TraderTips section of the magazine.

2025-11-12  Initial implementation
2025-11-14  Uploaded to github

https://github.com/jainraje/TraderTipArticles/

"""

# Import required python libraries

%matplotlib inline

import pandas as pd
import numpy as np
import yfinance as yf
import math
import datetime as dt
import matplotlib.pyplot as plt

# Use Yahoo Finance python package to obtain OHLCV data for desired instrument.

symbol = '^GSPC'
start = "2023-11-13"
end = dt.datetime.now().strftime('%Y-%m-%d')
end = '2025-11-15'
ohlcv = yf.download(
    symbol,
    start,
    end,
    group_by="Ticker",
    auto_adjust=True
)
ohlcv = ohlcv[symbol]
ohlcv

# three functions to implement concepts: 1) super_smoother 2) reversion_index
```



```
# and 3) plot_reversion_index to plot relevant signals

def super_smoother(price: pd.Series, period: float) ->
pd.Series:
    """
    Vectorized Ehlers SuperSmoother filter (© John F.
Ehlers)

    Parameters
    ----------
    price : pd.Series
        Input price series (e.g., closing prices)
    period : float
        Smoothing period

    Returns
    -------
    pd.Series
        Smoothed price series
    """
    q = np.exp(-1.414 * np.pi / period)
    c1 = 2 * q * np.cos(np.radians(1.414 * 180 / period))
    c2 = q * q
    a0 = (1 - c1 + c2) / 2

    price_vals = price.to_numpy()
    out_values = np.zeros_like(price_vals)

    # Initialize first four values to the original price
    out_values[:4] = price_vals[:4]

    # Apply recursive filter from index 4 onward
    for i in range(4, len(price_vals)):
        out_values[i] = a0 * (price_vals[i] + price_vals[i-1]) +
c1 * out_values[i-1] - c2 * out_values[i-2]

    return pd.Series(out_values, index=price.index)


def reversion_index(close: pd.Series, length: int = 20) ->
pd.DataFrame:

    """
    Ehlers Reversion Index (© 2025 John F. Ehlers)
    Correct and fully vectorized Python version.
    """
    close = close.astype(float)

    # Delta: change from previous bar
    delta = close.diff().fillna(0)

    # Rolling sums of delta and absolute delta
    delta_sum = delta.rolling(window=length, min_peri-
ods=1).sum()
    abs_delta_sum = delta.abs().rolling(window=length,
min_periods=1).sum()

    # Ratio: safely avoid division by zero
    ratio = delta_sum / abs_delta_sum.replace(0, np.nan)
    ratio = ratio.fillna(0)

    # Smooth and trigger lines
    smooth = super_smoother(ratio, period=8)
    trigger = super_smoother(ratio, period=4)

    return pd.DataFrame({
        'ReversionSmooth': smooth,
        'ReversionTrigger': trigger
    }, index=close.index)


def plot_reversion_index(df):

    import matplotlib.pyplot as plt
    import matplotlib.dates as mdates

    fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(12, 9),
sharex=True, gridspec_kw={'height_ratios':[2,2]})

    # ----- Top: Price & SuperSmoother -----
    ax1.plot(df.index, df['Close'], label='Close', lin-
ewidth=1)
    ax1.plot(df.index, df['SuperSmoother'],
label='SuperSmoother', linewidth=2, alpha=0.6,
color='orange')

    # Shading for bullish/bearish signals
    ax1.fill_between(df.index, df['Close'].min(), df['Close'].
max(),
                     where=df['Signal'] == 1, color='green', al-
pha=0.1)
    ax1.fill_between(df.index, df['Close'].min(), df['Close'].
max(),
                     where=df['Signal'] == -1, color='red', al-
pha=0.1)

    ax1.set_title('Price & SuperSmoother with Signal')
    ax1.grid(True)
    ax1.legend(loc='center left', bbox_to_anchor=(1, 0.5))

    # ----- Bottom: ReversionSmooth & ReversionTrigger
-----
    ax2.plot(df.index, df['ReversionSmooth'],
label='ReversionSmooth', linewidth=1, color='red')
    ax2.plot(df.index, df['ReversionTrigger'],
label='ReversionTrigger', linewidth=1, color='darkblue')
    ax2.axhline(0, color='gray', linestyle='--', linewidth=1)

    # Overlay signal as step plot
    #ax2.step(df.index, df['Signal'], where='mid',
label='Signal', color='purple', linewidth=1.5, alpha=0.5)

    ax2.set_title('Reversion Index with Signal')
    ax2.grid(True)
    ax2.legend(loc='center left', bbox_to_anchor=(1, 0.5))

    # ----- Improve date formatting on the bottom subplot
-----
    ax2.xaxis.set_major_locator(mdates.AutoDateLoca-
```

Continued on page 25