

ReadySetCrypto Futures Masterclass



Study Addendum: The RSI in Laguerre Time with
Embedded Fractal Energy

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The RSI in Laguerre Time with Embedded Fractal Energy

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Introduction - The RSI in Laguerre Time with FE

This addendum is just a quick guide to my favorite intraday/short-term study that I have been using since 2016.

First off, let me explain the name and the origin of this study.

I have been using the Choppiness Index by EW Dreiss since about 2006; in the way that I use this study, I refer to it as the “Fractal Energy” study. Around 2016, a very talented engineer who goes by the handle of “Mobius” decided to combine this study with the RSI, or Relative Strength Index. I have the Chop Index/Fractal Energy to provide me “context” of what the price is doing at that timeframe, and the RSI provides a very sensitive “trigger” signal for long/short.

In 2019, a ReadySetCrypto member (Cryptomaniac) was able to transcribe this study into TradingView Pine code, and also add several very useful features. The rest of this guide explains the rationale behind using this indicator, as well as the functions of this study.

[The Embedded Fractal Energy](#)

First off, I’m going to blow through the basic definitions/application of “Fractal Energy” because this is covered in my Fractal Energy Trading Masterclass. The main idea to understand is that “Range Expansion” leads to a low “energy” level as measured by the Choppiness Index, which normally leads to an “exhaustion” condition with a low Choppiness Index value and “Range Contraction.” At this point the chart coils up, recharges, and increases the Choppiness Index value again until the potential has been built up for the next move. Range contraction leads to Range expansion and back to Range contraction again, and the cycle repeats forever. I think of the Choppiness Index as a “fuel gauge” showing the potential for a price chart to either trend or stall.

This study is considered “embedded” because we’re using the default TradingView Choppiness Index, and it generally occupies the center of the vertical scale of this integrated study.

The important values on the vertical scale are generally >55 which represents “fully charged” where the chart has been consolidating and is showing potential to move, or <38 which shows that a chart **has** been moving in a linear fashion, and is likely to stall or retrace soon.

As you’ll see in the study options, there are several ways that we can alter the look and feel of the study to give a better visual reference as to what’s happening on the chart.

The RSI in Laguerre Time

What is “Laguerre Time” and why is it used? Think about the normal limitations of every other study that uses a linear time base...most studies use a “look-back” over the past “n” days, usually something like n=14 which is a standard value for the Wilder RSI.

The problem with a linear time series for any study is that it gives equal weight to a candle from 14 periods ago...as it does to the most recent candle. So a quick price movement will eventually cause a signal on an indicator that uses price & volume as its inputs....but it will be **lagging**.

The Laguerre polynomials are given by the sum

$$L_n(x) = \sum_{k=0}^n \frac{(-1)^k}{k!} \binom{n}{k} x^k,$$

where $\binom{n}{k}$ is a binomial coefficient.

The Rodrigues representation for the Laguerre polynomials is

$$L_n(x) = \frac{e^x}{n!} \frac{d^n}{dx^n} (x^n e^{-x})$$

and the generating function for Laguerre polynomials is

$$g(x, z) = \frac{\exp\left(-\frac{xz}{1-z}\right)}{1-z} = 1 + (-x+1)z + \left(\frac{1}{2}x^2 - 2x+1\right)z^2 + \left(-\frac{1}{6}x^3 + \frac{3}{2}x^2 - 3x+1\right)z^3 + \dots$$

A contour integral that is commonly taken as the definition of the Laguerre polynomial is given by

$$L_n(z) = \frac{1}{2\pi i} \oint \frac{e^{-zt/(1-t)}}{(1-t)^{n+1}} dt,$$

where the contour γ encloses the origin but not the point $z=1$ (Arfken 1985, pp. 416 and 722).

The Laguerre polynomials satisfy the recurrence relations

$$(n+1)L_{n+1}(x) = (2n+1-x)L_n(x) - nL_{n-1}(x)$$

(Petkovšek *et al.* 1996) and

$$xL'_n(x) = nL_n(x) - nL_{n-1}(x).$$

The Laguerre time series is different. I tried to do some research on it as to what it was and how it worked, and quite frankly when I saw differential equations tied to it I started to see stars and had flashbacks to my engineering days that were not pleasant.

So here's my summation of it: **The Laguerre Time Series is more responsive to recent price moves.**

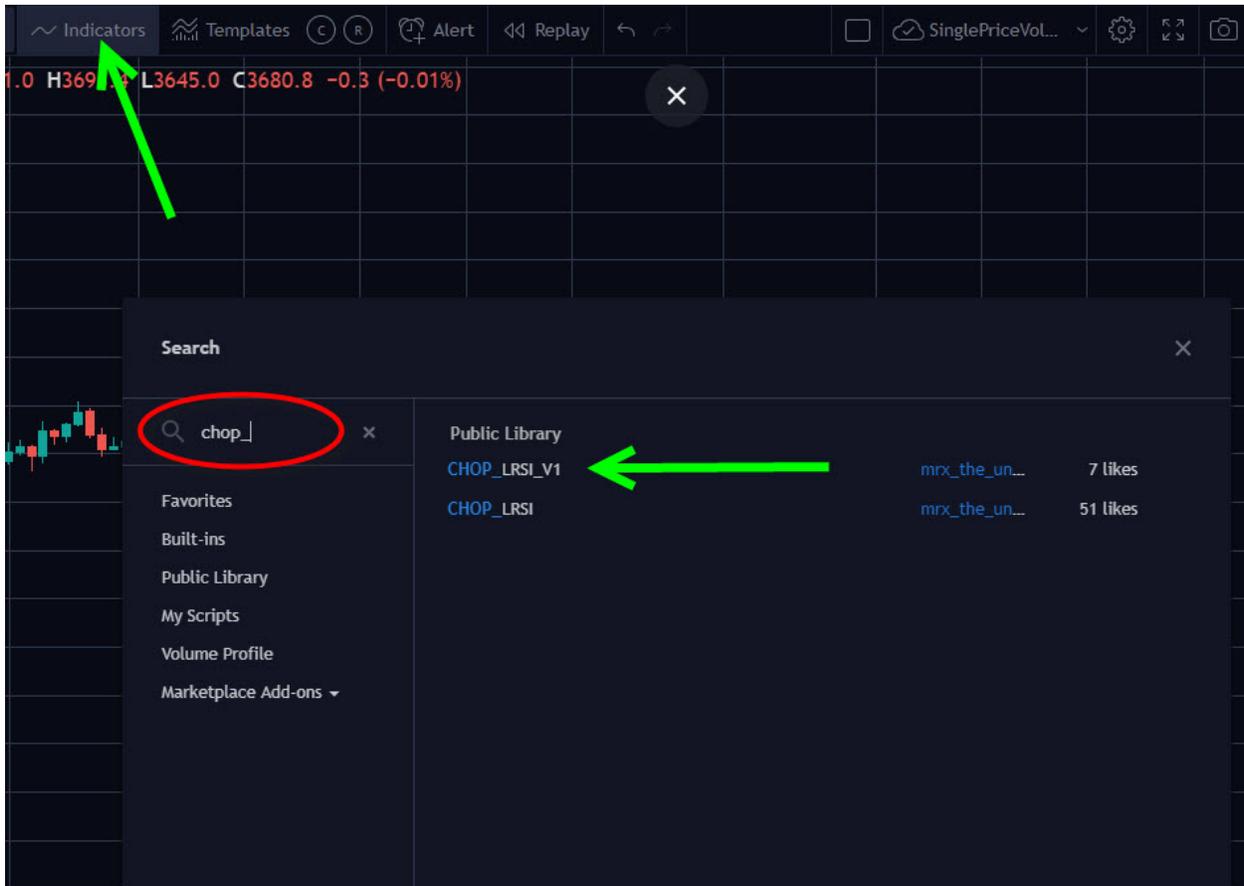
And this characteristic of it creates a much more responsive, “binary” type of “long” or “short” confirmation signal.

Now before you get the idea that this study is somehow the missing “Holy Grail” of trading, banish the thought. The most accurate and responsive indicator is still “price” itself, however the RSI in Laguerre Time does provide a nice, responsive confirmation signal for any directional trading that you wish to pursue, regardless of market or timeframe.

OK, with that background in place, let's see how to download and use this study.

Installing the RSILg Study

Let's first install the study. To a naked price chart, go to the "Indicators" tab and start typing in "CHOP_LRSI" into the search box. Look for the file called CHOP_LRSI_V1!



Click on the filename and the CHOP_LRSI_V1 study will be added to your chart.



Editing the Study

Let's see what options are available to edit on this powerful indicator; the first thing that you need to do is to "Format" the study to get at the edit mode:



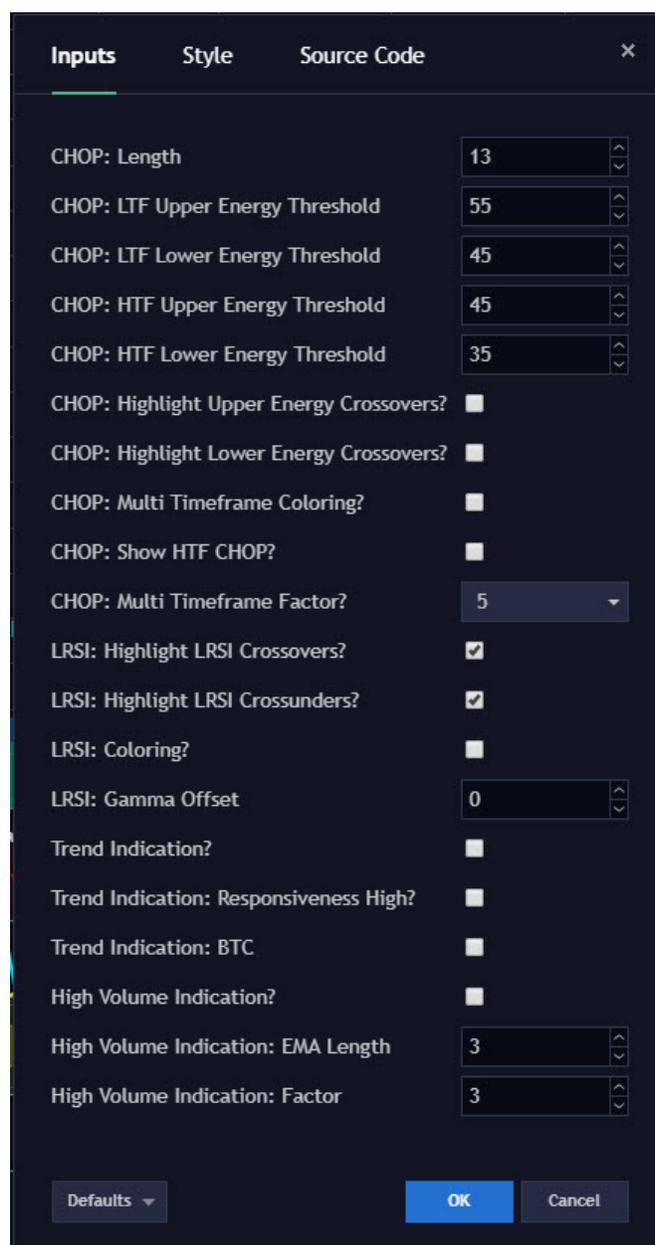
You can also perform this by right-clicking on the study itself and selecting "settings." Before we get to mucking about with the study, let's frame the default functions first:



The right-hand scale goes 0 to 100 so both studies are “bounded” and share the same 0-100 scale. The Embedded FE is yellow, and the RSI in Laguerre Time is cyan. Note also that the RSI has the 0-20 zone colored green to show the “oversold” zone that longs usually signal from, and the corresponding 80-100 zone is red to signify the “overbought” zone that usually generates the short signals.

In the middle of the scale is where the Chop Index/FE lives, signified by configurable colored zones that by default are marked between 38.2 and 61.8.

Right out of the box, as downloaded, this is exactly how I use the RSILg study, and have used it for several years now. Now let’s see what we can edit:



The first variable is the “Chop Length.” Normally I run this parameter at a value of 14 for swing-and-longer trades, but I find that a value of 13 works best for short-term intraday trades, as the time base is shared with the RSI study and tends to make it more unresponsive if this parameter gets too long.

Next we get into “LTF” and “HTF” energy thresholds. This study has the ability to also graph the energy on the “Higher Time Frame (HTF)” or “Anchor” chart (again, a Fractal Energy Trading principle) so that you don’t need to necessarily graph multiple timeframes. The LTF, or “Lower Timeframe” is what is represented on THIS chart.

The Lower TimeFrame and Higher Timeframe Thresholds control not only the shading on the middle area of the study, but also the coloring of the LTF chart based on the value of the HTF energy level; this can be turned on with the “CHOP: Multi Timeframe Coloring” switch.

The “CHOP: Highlight Upper/Lower Energy Crossovers” will graph transitions into high or low energy (as defined by the thresholds) on the LTF chart.

If you also want to see a representation of the HTF or “anchor chart” energy, you can enable the “CHOP: Show HTF Chop” switch and you’ll see a second Chop energy value which is a different color. (all colors are selectable on the “Style” tab of the study format.)

The CHOP: MultiTimeframe Factor pick list is selectable between 5x and 25x; this represents the time “factor” between THIS chart and the “HTF” chart. These map out to pre-defined relationships like so:

Factor 5: 12min => 60min, 60min => 300min, 300min => D, D => W, W => M, M => 5M

Factor 25: 12min => 300min, 60min => D, 300min => W, D => M, W => 5M, M => 25M

If none of these timeframes is selected then the default HTF will be D. The current smallest “signal” timeframe is 12min. e.g. if you select 1 min for this chart then the HTF will default to D or daily.

Now we get into the LRSI options; the first that is configured by default are the “LRSI: Highlight Crossover/Crossunder” options. These show when the LRSI plot is crossing down below 80, or up above 20.

LRSI Coloring gives a different color representation showing red on bearish trade confirms, and green on bullish confirmations.

LRSI: Gamma offset is something that most users should not mess with as it affects the responsiveness of the LRSI plot.

Trend Indication will place a red or green dot below the plot indicating that the HTF is in a trend; you can experiment with the “Responsiveness High” switch depending on your coin’s volatility.

Trend Indication:BTC will also place a red or green “B” if BTC itself is in a primary trend at the HTF.

Lastly, the High Volume Indication will print a red or green “V” if higher-than-average volume is detected, as based on the two moving averages in the format box.

Using the RSILg Study

Before I start talking about the application of this study, two quick points:

- Please don't slap this study on your charts and start trading live capital with it. Earn the right to do so through demonstrated performance first. You won't learn enough about a technical indicator from a ten-page guide to be able to harvest profits using it. Creating a system of your own is where profits can be created. This study is merely a tool as a means to an end; I think it's a powerful tool, but only in the hands of someone that's spent the time and taken the reps to know what it means.
- Start with the default view and only add the options that you need; less is more.

In my Futures class I will discuss a full "framework" which is not only the fractal technical setup for entry/exit, but also the process for how one can "earn the right" to gain skills and progressively create a positive expectancy system. You did tell someone at some point that you were going to treat this like a business, right? I'm just trying to make the point very clear that a single technical study is only one piece of the whole puzzle.

OK, let's look at a chart again:



The very FIRST thing that I want you to do is to understand the CONTEXT of what is going on with the price using the yellow Chop Index/FE. Is the price trending and has it

hit exhaustion yet? Or is it consolidating and ready to MOVE? Understanding the context of what the price is doing is so much more important than anything else that you can do with this indicator combination.

For most of us trading crypto, the most powerful signal will be found when the FE shows a very high level, like >61.8 , and the price breaks in the direction of the Anchor chart (HTF) swing.



When the price breaks the consolidation, the cyan RSI will “hook” out of the OB/OS zone and fire one of the breakout indications.

You can see this in action in the following screenshot; a downtrend loses momentum and begins to consolidate sideways, creating a high “energy” condition on the yellow FE line.

That gives me the CONTEXT that the price is in consolidation, and “range contraction” like this leads to “range expansion.”

Which way will it break? I don’t presume to know this ahead of time, but if the descending trend line (green) is broken to the upside, then that “prints” a higher low in price, and the cyan RSI line “hooks up” as shown by the green triangle alert. That gives me a long entry signal, and moves like this can be very powerful since traders on the wrong side of the trade get “trapped.”

“Edge” like this is normally found by identifying situations like this where the “dumb money” is entering too late into an established position, and you are becoming the “smart money” by getting into a trend reversal right when it happens.

Next Steps

While this is a very powerful set of tools combined into one study/indicator, the normal temptation is to turn on every available option in the format box, which takes us right back to the usual issue that most retail traders have, which is information overload. More information does not necessarily create a better decision.

Start with the default data set and only add those tools that you must have to help you sort through the information.

You can also “alert” on the various elements of the study, such as RSI crossover/crossunders. These can be sent to your email inbox or your cell phone SMS connection.

If you have any questions about this study, please consider joining my Futures Masterclass where we show how to apply this study in the context of an entire fractal system, or contact me at support@readyscrypto.com

Best of luck in your trading business!

Doc Severson
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