



Optimized Linear Regression Channel

alexgrover WIZARD Aug 10, 2020

Advanced Micro Devices Inc - 15 · NASDAQ · TradingView 081.24 H81.72 L81.15 C81.56
Optimized Linear Regression Channel

Return a linear regression channel with a window size within the range `(min, max)` such that the R-squared is maximized, this allows a better estimate of an underlying linear trend, a better detection of significant historical supports and resistance points, and avoid finding a good window size manually.

Settings

- Min : Minimum window size value
- Max : Maximum window size value
- Mult : Multiplicative factor for the rmse, control the channel width.
- Src : Source input of the indicator

Details

The indicator displays the specific window size that maximizes the R-squared at the bottom of the lower channel.

alexgrover published on TradingView.com, August 10, 2020 10:50:02 EST

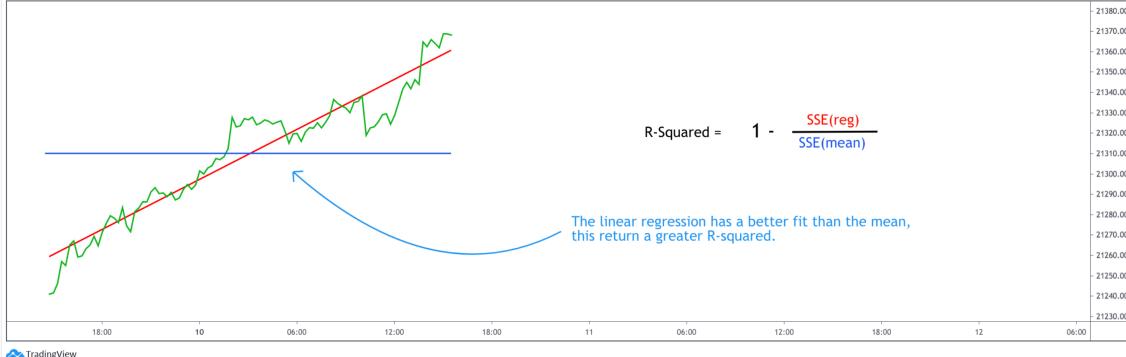
BITFINEX:XRPUSD,15 0.29540 ▲ +0.00759 (+2.64%) O:0.29348 H:0.29540 L:0.29348 C:0.29540

XRP / U.S. Dollar, 15, BITFINEX
Optimized Linear Regression Channel

When optimizing we want to find parameters such that they maximize or minimize a certain function, here the r-squared. The R-squared is given by 1 minus the ratio between the sum of squares (SSE) of the linear regression and the sum of squares of the mean. We know that the mean will always produce an SSE greater or equal to the one of the linear regression , so the R-squared will always be in a (0,1) range. In the case our data has a linear trend, the linear regression will have a better fit, thus having a lower SSE than the SSE of the mean, has such the ratio between the linear regression SSE and the mean SSE will be low, 1 minus this ratio will return a greater result. A lower R-squared will tell you that your linear regression produces a fit similar to the one produced by the mean. The R-squared is also given by the square of the correlation coefficient between the dependent and independent variables.

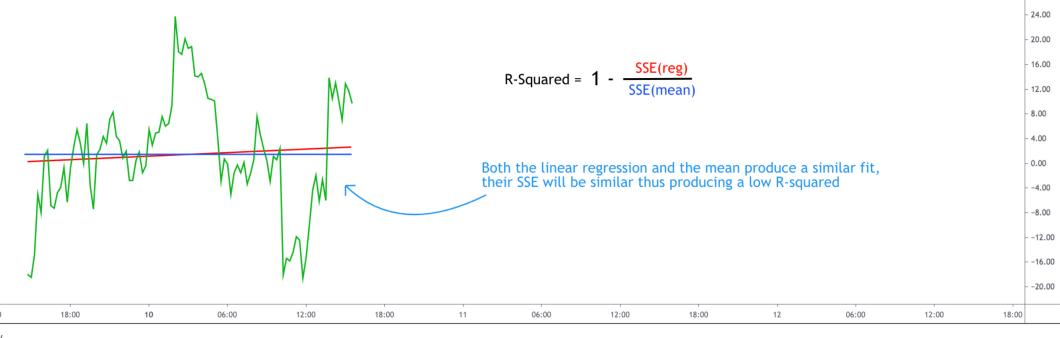
alexgrover published on TradingView.com, August 10, 2020 10:34:08 EST

COINBASE:LTCUSD,15 58.04 ▲ +1.07 (+1.88%) O:58.16 H:58.19 L:58.04 C:58.04



abcdpattern

alexgrover published on TradingView.com, August 10, 2020 10:37:12 EST
COINBASE:LTCUSD, 15 58.01 ▲ +1.04 (+1.83%) O:58.16 H:58.19 L:57.97 C:58.01



In pinescript optimization can be done by running a function inside a loop, we run the function for each setting and keep the one that produces the maximum or minimum result, however, it is not possible to do that with most built-in functions, including the function of interest, `correlation`, as such we must recreate a rolling correlation function that can be used inside loops, such functions are generally loops-free, this means that they are not computed using a loop in the first place, fortunately, the rolling correlation function is simply based on moving averages and standard deviations, both can be computed without using a loop by using cumulative sums, this is what is done in the code.

Note that because the R-squared is based on the SSE of the linear regression, maximizing the R-squared also minimizes the linear regression SSE, another thing that is minimized is the horizontality of the fit.

Markets Allocation



alexgrover published on TradingView.com, August 10, 2020 10:42:49 EST
COINBASE:LTCUSD, 15 58.03 ▲ +1.06 (+1.86%) O:58.16 H:58.19 L:57.97 C:58.03



In the example above we have a total window size of 27, the script will try to find the setting that maximizes the R-squared, we must avoid every data points before the volatile bearish candle, using any of these data points will produce a poor fit, we see that the script avoid it, thus running as expected. Another interesting thing is that the best R-squared is not always associated to the lowest window size.

IDEAS STRATEGY

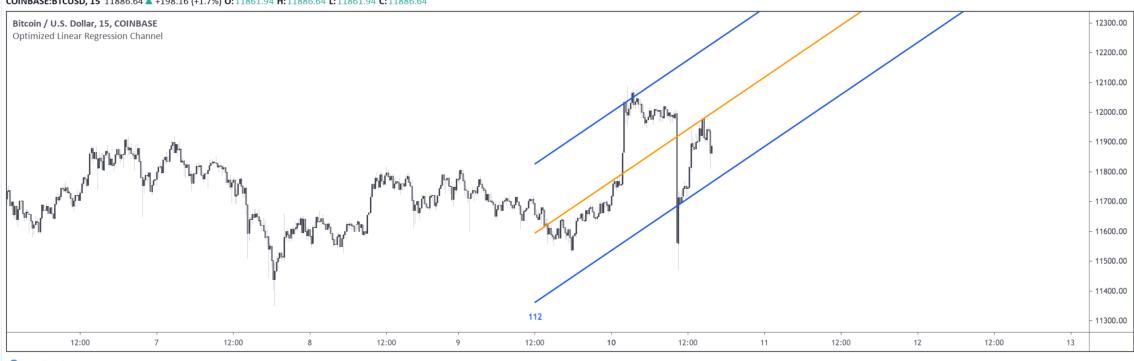
PUBLISHED CODE

abcdpattern

Circular



alexgrover published on TradingView.com, August 10, 2020 10:47:26 EST
COINBASE:BTCUSD, 15 11886.64 ▲ +198.16 (+1.7%) O:11861.94 H:11886.64 L:11861.94 C:11886.64



Note that optimization does not fix core problems in a model, with the linear regression we assume that our data set posses a linear trend, if it's not the case, then no matter how many settings you use you will still have a model that is not adapted to your data.

I love everyone



Markets Allocation

IDEAS STRATEGY

PUBLISHED CODE

abcdpattern

Circular



Patreon: <https://www.patreon.com/alexgrover>

Become a Patreon and get access to exclusive technical indicators!

You can also check out some of the indicators I made for luxalgo : <https://www.tradingview.com/u/LuxAlgo/#published-scripts>

[Twitter](#) [Website](#)

Open-source script

In true TradingView spirit, the author of this script has published it open-source, so traders can understand and verify it. Cheers to the author! You may use it for free, but reuse of this code in a publication is governed by [House Rules](#). You can favorite it to use it on a chart.

Disclaimer

The information and publications are not meant to be, and do not constitute, financial, investment, trading, or other types of advice or recommendations supplied or endorsed by TradingView. Read more in the [Terms of Use](#).

Want to use this script on a chart?

[★ Add to favorite indicators](#)

```

3
4 //@version=4
5 study("Optimized Linear Regression Channel",overlay=true)
6 min = input(14,minval=4)
7 max = input(28)
8 mult = input(2)
9 src = input(close)
10 //-----
11 cmla = cum(src)
12 cmlb = cum(cmla[1])
13 cmc = cum(src*csrc)
14 //-----
15 r(p)=>
16 sum = cmlb - cmlb[p]
17 a = (p*cmla-sum)
18 b = cmla - cmla[p]
19 c = cmc - cmc[p]
20 //-----
21 num = (c - b*(p+1)/2)/p
22 vary = c/p - pow(b/p,2)
23 varx = (p*p - 1)/12
24 pow(num/sqrt(vary*varx),2)
25 //-----
26 k = 0,,p = 0
27 for i = min to max
28   c = r(i)
29   k := max(c,k)
30   p := k == c ? i : p
31 //-----
32 den = p*(p+1)/2
33 wma = (p*cmla-(cmlb - cmlb[p]))/den
34 sma = (cmla - cmla[p])/p
35 A = 4*sma-3*wma, B= 3*wma-2*sma
36 //-----
37 Var = (cmc - cmc[p])/p - pow((cmla - cmla[p])/p,2)
38 rmse = sqrt(Var - r(p)*Var)*mult
39 //-----
40 n = bar_index
41 var line ln = na
42 var line up = na
43 var line dn = na,
44 var label la = na
45 transparent = color.new(color.white, 100)
46 if n > min
47   ln := line.new(n|p-1,A,n,B,extend=extend.right,
48   |color=#f9880, width=2)
49   up := line.new(n|p-1,A+rmse,n,B+rmse,extend=extend.right,
50   |color=#2157f7, width=2)
51   dn := line.new(n|p-1,A-rmse,n,B-rmse,extend=extend.right,
52   |color=#2157f7, width=2)
53   la := label.new(n|p+1,A-rmse,tostring(p),color=transparent,
54   |style=label.style_label_up, textcolor=#2157f3)
55 line.delete(ln[1]),line.delete(up[1]),line.delete(dn[1])
56 label.delete(la[1])

```

Comments

Leave a comment that is helpful or encouraging. Let's master the markets together

[Comment with cheer](#)

[Post Comment](#)

 **mariuspe** · Aug 13, 2020 [Reply](#)

Great indicator! Guys, any idea how to make an alert for the change of direction of those 3 lines?
Thanks!

[+6 ▲ Reply](#)

 **joan241** · Aug 13, 2020 [Reply](#)

@mariuspe, Indeed, and alert for the change of direction can be nice.

[▲ Reply](#)

 **MadhaNxHat** · Jun 19, 2021 [Reply](#)

@mariuspe, yes , it will help a lot .

[▲ Reply](#)

 **BorsaPanda** **PREMIUM** · Nov 30, 2020 [Reply](#)

Alex.Thanks. This is a great help. I did 2 things.

- 1.) I stopped using traditional trend lines.
- 2.) I use 2 of the same indicator with different settings. i.e. one shorter bracket the other longer bracket.

[+2 ▲ Reply](#)

 **MasBart** **PRO+** · Aug 22, 2020 [Reply](#)

This is the best regression channel script so far, thanks @alexgrover !
but why sometimes it gave Study Error negative index -1 ?

[+1 ▲ Reply](#)

 **alexgrover** **WIZARD** · Aug 22, 2020 [Reply](#)

@MasBart, Thanks for reporting the problem, I will fix this :)

[▲ Reply](#)

 **MasBart** **PRO+** · Aug 23, 2020 [Reply](#)

@alexgrover, you're welcome.

[▲ Reply](#)

 **jerah310a** · Aug 11, 2020 [Reply](#)

Thanks again, Alex.

[+1 ▲ Reply](#)

 **ICEKI** **PREMIUM** · Aug 11, 2020 [Reply](#)

That very nice item; thank you so much Alex <3

[+1 ▲ Reply](#)

DannyBaker PRO · Aug 10, 2020
Great!! Thanks Alex!
[+1](#) [Reply](#)

Pratik_4Clover · Aug 10, 2020
Fantastic!!! Thank you!
[+1](#) [Reply](#)

phir PRO · Feb 16
Alex, you are a genius. Many thanks.
[▲ Reply](#)

Redfastred · Sep 26, 2021
Great...
[▲ Reply](#)

inet100 PREMIUM · Sep 17, 2021
Hello, trying to test indicator but got error message. In some cases it works on higher time frame, but do not work on lower timeframe like 1 min. Image attached - prnt.sc/1sjbup6
[▲ Reply](#)

tyler8910 PREMIUM · Aug 29, 2021
Alex, this is excellent. Really appreciate you creating this. I'd also like to tweak the study to work on log charts. If I could combine what you've done here with Forza's "Linear Regression (Log Scale)" study, I'd have the perfect indicator. Would you be able to help with this?
[▲ Reply](#)

Yogesh_Raj · Jul 28, 2021
Thanks. It was good. Extended lines are too much extended for me. how do i limit the projection to certain bars?
[▲ Reply](#)

missymoomoo · Jul 4, 2021
Love this! Thanks Alex. Any chance you can develop a similar optimised script for polynomial regression?
[▲ Reply](#)

Namoraab93 · Mar 9, 2021
Hey dude This looks awesome! I have added it to my favourites but it doesn't come up?
[▲ Reply](#)

bidgr PRO+ · Dec 10, 2020
Great script. Any ideas which settings would be best for a 5 minute intraday chart? Going from ET time 0930-1600? Thanks.
[▲ Reply](#)

st4ndard PRO+ · Oct 18, 2020
It would be nice if the R-squared was also written out, so you knew if it was "maximized" to .68 :) Other then that, nice script.
[▲ Reply](#)

bpu4211 · Sep 4, 2020
Also getting the Negative index -1 when I try to create a regression line starting from the beginning of the session. Guess it doesn't like to calculate too much...
[▲ Reply](#)

alexgrovier WIZARD · Sep 4, 2020
@bpu4211, I'll fix the errors, please be patient...
[+1](#) [Reply](#)

bpu4211 · Sep 5, 2020
@bpu4211, My mistake your script is working well!
[▲ Reply](#)