The sub-sequence theorem:

When you have constructed a partial DNA for your currency pair; the following theorem is extremely useful for spotting market trends embedded within the DNA. In fact, what it actually reveals to you is the following truth: Trends exist everywhere.

> *Attached Image (click to enlarge)*
>
> **Theorem 0.1.1** *Let $x_1, \ldots, x_{n^2+1}$ be any sequence of distinct reals. Then there exists either an increasing or decreasing $(n+1)$-subsequence.*
>
> We refer to this as *the subsequence theorem* throughout.
>
> We present five (known) proofs of the subsequence theorem. We first tell how we were lead to these proofs. After Martin Kruskal died, Clyde Kruskal (his son) was looking through his papers. He found a manuscript, dated 1950, by Joseph Kruskal that discusses the subsequence theorem and some multidimensional versions of it. This manuscript contained two proofs of the subsequence theorem, one by Martin Kruskal and one by Joseph Kruskal. At the time Joseph Kruskal did not know that Erdös and Szekeres had proven the subsequence theorem 15 years earlier. By the time Joseph Kruskal published the manuscript (which contained other things of interest) he had learned of the Erdös Szekeres paper and referenced it; however, he omitted his proof of the theorem and only sketched Martin Kruskal's proof, in the published version [3]

It will hold and so you can analyse each bar....

> *Attached Image (click to enlarge)*
>
> **Proof:** Let $x_1, \ldots, x_{n^2+1}$ be any sequence of distinct reals. Assume, by way of contradiction, that there are no increasing or decreasing $(n+1)$-subsequences.
>
> Let f be the function with domain $[n^2+1]$ and co-domain $[n]$ that is defined by
>
> $f(i)$ = length of longest increasing subsequence that ends with x_i.
>
> Since f has domain of size n^2+1 and range of size n, there exists $i_1, \ldots, i_n, i_{n+1}$ and a such that
>
> $$f(x_{i_1}) = f(x_{i_2}) = \cdots = f(x_{i_{n+1}}) = a.$$
>
> Let $1 \leq j \leq n$. Note that $x_{i_j} > x_{i_{j+1}}$ since otherwise there would be an increasing $a+1$ subsequence that ends with $x_{i_{j+1}}$ (take the increasing a-subsequence that ends with x_{i_j} and add $x_{i_{j+1}}$ to it). Hence
>
> $$x_{i_1} > x_{i_2} > \cdots > x_{i_{n+1}}$$
>
> is a decreasing $(n+1)$-subsequence, which is a contradiction. ∎

You can choose what your sequence of real numbers will be : value of HIGH/LOW.CLOSE/OPEN maybe. I am sure you can see the gold in there.

The subsequence is the key step to revolution. The subsequence theorem can allow you to zero in on the market, if you have the time to look for those sequences.

This theorem is not mine. There are about 22 different proofs of the theorem. If it is true - I cannot say till I prove it myself - then it is the most powerful tool apart from TZ that I have presented here.
This theorem means MONEY, if true!

The truth of the statement depends on what they mean by subsequence. If they mean a sequence defined linearly on n then I will say there are cases where it is not true. If they allow any possible sequence on n then, yes it is true.

So, if the latter is the case then there is one more option for the example I gave. Still it is a powerful tool.

My version applicable to trading:::

Attached Image (click to enlarge)

Decreasing-increasing sequence in set theorem

EURUSDD

ABSTRACT. -

Part 1. Introduction

1. Result

-

THEOREM 1. *Let $n \in \mathbb{N}$ and A_{n^2+1} a set with n^2+1 distinct real numbers. Then there exists a subset B of A_{n^2+1} such that B contains $n+1$ elements and these elements form a decreasing or increasing sequence.*

NOTE: The theorem is most powerful if subsequences - in the definition, is defined linearly on n. But in this case I have a problem with a theorem for which there are 22 different proofs.

Quoting DavidRP

> {quote} when you have 0 1 2 3 4 5 , and n=2 you always can find a subsequence of 3 either increasing or decreasing but it doesnt have to be 0-1-2 or 2-3-4 or 3-4-5 it can be 0-2-5 or 1-3-4 or 0-4-5 so you can not predict that high must finish below or above something because a different unsorted sequence can be found without the need of the last point going below or above something

The power of the theorem lies in this observation.
For a given n, look in the DNA for a set of n^2 distinct real numbers forming some sequence that ends on the current number you are interested in. That is, if we include the current number, we should have n^2+1 distinct elements. Now, if you set does not have an n+1-increasing or n+1-decreasing subsequence; find the lowest and the highest value in your set. The number you are interested in should be above the highest or below the lowest value!

The problem reduces to finding that n^2 set of distinct numbers with no n+1-increasing or n+1-decreasing subsequence. The if your current number is different from the n^2, it should create the sequence you are after.

I really do not get your problem. This example is for a the case where the sequence is listed and subsequence defined linearly on n. Lol. What is your stress. t application of the theorem or the special case i represented?
That is why I stated the theorem in the form below so that sorting out is eliminated.

Attached Image (click to enlarge)

Decreasing-increasing sequence in set theorem

EURUSDD

ABSTRACT. -

Part 1. Introduction

1. Result

-

THEOREM 1. *Let $n \in \mathbb{N}$ and A_{n^2+1} a set with n^2+1 distinct real numbers. Then there exists a subset B of A_{n^2+1} such that B contains $n+1$ elements and these elements form a decreasing or increasing sequence.*

I don't understand the maths at all.

But this is what I have been able to decipher - and I come to no conclusions, just feeding in the numbers:

Data:
Highs of 4 bars: 1.2344, 1.2566, 1.2211, 1.2222
Domain = [n sqred + 1]
Subsequence = [n + 1]

If we set n = 2 then
Domain = 2 squared + 1 = 5
Subsequence = 2 + 1 = 3

Reading this example yields this experiment....
Increasing Subsequence:
1.2344, 1.2566
1.2211, 1.2222
that's 2 increasing subsequences, taking the given order

Decreasing Subsequence:
1.2566, 1.2211
1.2566, 1.2222
1.2344, 1.2222
1,2344, 1.2211
that's 4 decreasing subsequences, taking the given order

> The real reason for submitting this is to find a probabilistic statement for a listed sequence where all sub-sequences in the statement are also listed.
> If the probability is high enough, game on!!!

I will come back in the future with my findings. Thank you all.

Attached Image (click to enlarge)

1. This is the KEY question

PROBLEM 1. *-Given a sequence of n^2+1 real numbers; $f(1), f(2), ..., f(n^2+1)$ what is the probability that this sequence contains a sequence of the form*

$$f(i) < f(i+k) < \cdots < f(i+nk)$$

or

$$f(i) > f(i+k) > \cdots > f(i+nk) \tag{1.1}$$

for some fixed $i \in \{1, 2, 3, ..., n^2+1\}, k \in \mathbb{N}$

Attached Image (click to enlarge)

Decreasing-increasing sequence in set theorem

EURUSDD

Abstract. -

Part 1. Introduction

1. Result

-

Problem 1.

Theorem 1. *Given a sequence of* 5 *distinct randomly chosen real numbers;* x_1, x_2, x_3, x_4 *and* x_5 *(listed consecutively) the probability that*
(i) $x_1 < x_2 < x_3$ *(or* $x_1 > x_2 > x_3$*) or*
(ii) $x_1 < x_3 < x_5$ *(or* $x_1 > x_3 > x_5$*) or*
(iii) $x_2 < x_3 < x_4$ *(or* $x_2 > x_3 > x_4$*) or*
(iv) $x_3 < x_4 < x_5$ *(or* $x_3 > x_4 > x_5$*)*
is 93.75%.

So for 10 consecutive highs if the theorem is not true for the first five, then the probability it is false for the second five also is 0.3%

Ok I assigned random number from 0-9 into x1,x2,x3,x4,x5 and see how the theorem works.

So replacing the set of numbers 0-9 instead with the last 5 high prices, one of the conditions should be valid 93.75% of the time.

If we encounter a failure then we can assume a 0.3% chance of the theorem failing for the next 5 high prices.

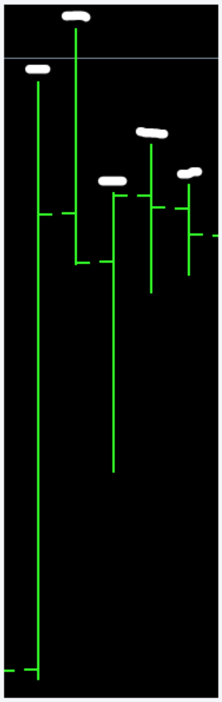
Which means the high we see in that set is likely indeed the high and we can sell?

Quoting xixi

{quote} Let me try to prove this theorem: From the 5-length sequence above, we could have the following 3-consecutive sub-sequences: 1 2 3 (*) 1 2 4 1 2 5 1 3 4 1 3 5 (*) 1 4 5 2 3 4 (*) 2 3 5 2 4 5 3 4 5 (*) So, it's 10 ones. And for each one, for ex: 1 2 3, we could have 4 cases: 1 < 2 < 3 1 < 2 > 3 1 > 2 > 3 1 > 2 < 3 There're 2 cases the sequence is increasing or decreasing (1 < 2 < 3 and 1 > 2 > 3) . So, prob. of the event in your theorem is: 4*2 / 10*4 = 2 / 10 = 20% or I missed something? Thank you!

Sure your proof is not correct.
Start with a given state and then look at all the branches of the tree coming out of your state. 1 for up and 0 for down. there should be 32 branches. only two will not have those conditions. so probability of 30/32.
One of those 6.25% cases.

Attached Image



Quoting NorthTrader

{quote} {quote} {quote} Thank you for your replies about my probability question. Yes, I understand what you mean, LiquidGenuis. And k's method is exactly what I was doing to obtain probability A (78.5%). You guys seem to be very good with statistics and probability, so unless someone else refutes choice A I'll assume that the correct probability in my example is 78.5%, not 97%. Eurusdd suggested that I would need to analyse about 23 million bars of data to get close to the true probability. I've only analysed about 20,000 so far. And...

The true probability is 1, ALMOST SURELY as stated in the proposition. The 97% is for a typical chart platform and the optimal values for k,h

Quoting LiquidGenius

{quote} Hm, is the theorem really only including those 4(or 8 depending on how you look at it) possibilities? Are these 3 not included intentionally? {image}

We are interested in sequences linearly dependent on n. the sequence x(1)>x(2)>x(4) is not valid because 1-2 is not equal to 2-4.

Sequences linearly defined on n makes the theorem powerful.

Hi Dr.
My areas of interest include probability and Number theory with focus on prime number distribution and ergodic theory. Well, anything uncertain or random will get my attention.
Now, proposition 1 is my own result and I have a 7 pages paper to support it, unpublished!
The sub-sequence theorem is not mine but a simple result in real-analysis.

Hi FXEZ,
I am also R user and I dont see any mistake.
I also got about 0.83.
If we consider all subsequence, then

Inserted Code

```
trials = 100000
success = 0
for (i in 1:trials) {
    x = rnorm(5) #sample(5) #runif(5) #rnorm(5)
   if ( ((x[1]<x[2] && x[2]<x[3]) || (x[1]>x[2] && x[2]>x[3])) ||
        ((x[1]<x[3] && x[3]<x[5]) || (x[1]>x[3] && x[3]>x[5])) ||
        ((x[2]<x[3] && x[3]<x[4]) || (x[2]>x[3] && x[3]>x[4])) ||
        ((x[3]<x[4] && x[4]<x[5]) || (x[3]>x[4] && x[4]>x[5])) ||
        ((x[1]<x[2] && x[2]<x[4]) || (x[1]>x[2] && x[2]>x[4])) ||
        ((x[1]<x[2] && x[2]<x[5]) || (x[1]>x[2] && x[2]>x[5])) ||
        ((x[1]<x[3] && x[3]<x[4]) || (x[1]>x[3] && x[3]>x[4])) ||
        ((x[2]<x[3] && x[3]<x[5]) || (x[2]>x[3] && x[3]>x[5]))
) {
        success = success + 1
    }
}
success / trials
```

We will get about 0.95. still not 0.9375.
Maybe we need further explanation from eurusdd.

Thank you.

edit: oh, eurusdd just answered to your post when I am writing.

> *Quoting stt*
>
> I think it is futile to use sub sequence theorem for any prediction of next bar as that would clearly be violation of the theorem itself. As the theorem says, no matter what the sequence is, the theorem holds. this implies price can be anywhere in the next point and theorem still holds. so clearly the theorem can not put any constraints on where price can go. I think you cant beat the market from pure numbers properties. Any theorem which works on random numbers is basically saying market prices can be random and will still satisfy the theorem so...

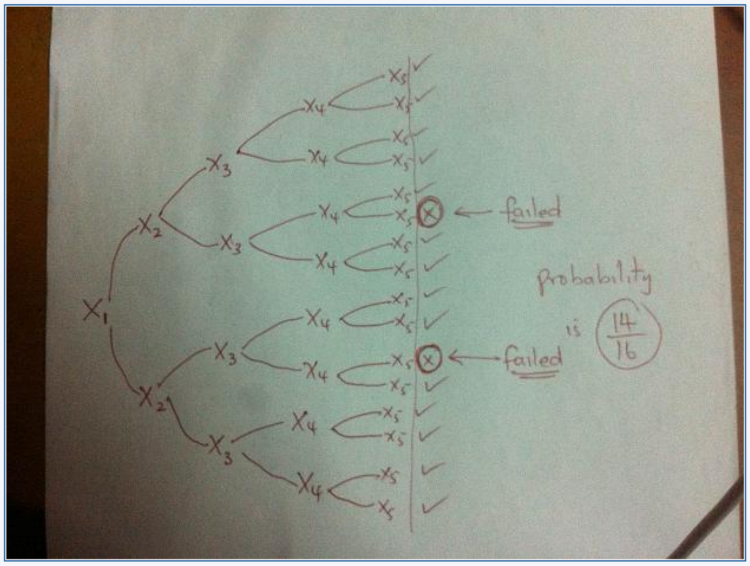
Sure, you are right. The sub-sequence theorem itself does not raelly give you an edge against the market, because it includes subsequences that are not defined linearly on n. Where you got it wrong is the argument I put forward. What happens when we restrict ourselves to subsequences defined linearly on n?
for the case of five points, I gave a result! There will be a 3-subsequences defined linearly on n 93.75% of the time.
That allows you to make money! Think deeply about it!

Defined linearly on n means what?
if you have a sequence listed as follows
x(1),x(2),x(3),x(4),x(5),x(6),x(7), x(8),x(9),x(10)
The the following are 4-subsequences of the sequence above
x(1),x(3),x(5),x(7)
and
x(1),x(2),x(7),x(9).

x(1),x(2),x(7),x(9) is not defined linearly on n because 1-2=-1, 2-7=-5, 7-9=-2: -1, -5 and -2 are not equal.

x(1),x(3),x(5),x(7) is defined linearly on n because 1-3=-2, 3-5=-2, 5-7=-2.

Attached Image (click to enlarge)



Now in the picture above, on any branch of the tree you move up/down depending on whether the next value is higher/lower.
Apart from the two fails, all branches give you one of those conditions. therefore, if we stop here, we should have probability 14/16=87.5%.
But if we look at the two fails, notice that in the top one $x(1)<x(3)$ but $x(5)$ can be lower or higher than $x(3)$. The reverse is the case for the branch below. If $x(5)$ is higher than $x(3)$, we have to split the remaining probability into two.
Now, 1-87.5%=12.5%.
So, we are interested in 87.5%+1/2(12.5%) = 93.75%.

OHLC/4 Loop Sequence

> *Quoting Dennis189*
> @ Kiads, I think i'm close to replicate your "bomb" indicator. I want to know 2 things about it. Do the bombs appear at the open of the candle or do they appear at the close? And they won't repaint ever? Also not after re-opening your chart/template? Kind regards, Dennis

Hi My Friend, here is the 'rule'

1. after all sub-sequences formula calculation give 'her' result,
2. look at the previous candle form, if bullish, then the result is for bearish direction, if bearish then the result is for bullish direction.
3. then the 'bomb' mark will appear if in bearish direction, current candle price should bellow previous candle high, and if in bullish direction, current price should above previous candle low. Meaning 'she' not always show up at candle open, but only if conditions met, because this calculation don't need any 'averaging' period to do 'her' job.

As you can see in my latest post about that 'arrow' and 'bomb', event if that marked candles goes in opposite direction that 'marks' stay and not change their direction pointing. so, in candle final 'form' they look like pointing wrong direction.. lol and that is exactly opposite with all that 'nice view' kind of history charts from trading system seller at eBay..

MTH

Hi My Friend PiratePip,

this is example on how to read my sequencer..

First, this sequencer indicator is my own interpretation of sub-sequence theorem from our Chief EURUSDD, so it might be so wrong because i'm just noob in this similarity field.

Not like other indicators, this sequencer don't have any period / averaging bars to calculate and purely use the theorem to sorting out all given datas, so what our Chief EURUSDD said is absolutely right 100%, the theorem will work in any time frames, any instruments/pairs and in any market conditions sideways, ranging, or trending.

I manage to find out how to make the theorem to pointing out 'where' the beginning of the curve of movement. As we know that 'candle' only 'visual illusion' of price movement. Its 'framing' the real movement into funny candle shape and 'slashing' it according to 'selected' time range and your broker server GMT time.

So, the real movement is always like parabolic curve of wave cycles with their own size in every point of price, meaning every price has it's own curve that in the future will be fulfilled. (it's just a matter of time that Arnie will be back.. lol).

Here we go the example picture from my current AUDUSD M30 long entry that still active when i make this post. to explain how this sequencer work.

Attached Image (click to enlarge)

1. for this down signal from the sequencer, this 'bomb' sign will show up if calculation condition met, and if current price pass high/low of previous candle. in this case current price bellow the previous bullish candle high. then the 'curve' of that 'marking' price start. Of course in any time after that 'down' sign, you can go short as long as you don't see 'up' sign. and you can put your risk (SL) just slightly above that 'bomb' sign because i already shift that sign to include spread.

2. I already close my previous short entry at this area, because we can 'see' it clearly that down movement already 'rejected' and can't go through that 2 horizontal lines (magenta dot color) that represents 2 'starting curves' from price history. So, that 2 previous 'starting curves' still active and AUDUSD will visiting there again some day in the future.

3. Regarding condition at point 2, when that 'up' bomb signal show up at point 3. I entry Long at that 1st M30 bullish candle, and add 1 more long entry at 2nd bullish candle when i see 'her' bottom wick can't 'touch' the horizontal magenta line that came from current 'up' signal

4. When this 'down' signal show up, i'm not close my current long entry (for this i also check higher TF, I'll explained later), so, i just open short entry to 'hedge' my long positions.

5.6.7 this 'hedge' and 'valve release' repeated according to latest signals. You can also 'see' that at point 4, 5, and 6, the 'curve' for that price already 'closed' and done. But for point 7 and all signal after that still active until now.

Finally just now, (around hour ago), price curve from point 1 also 'closed' and done. and that is my 'actual' target, but i keep my long positions for a while, because higher TF tell me where the price movement might go..

let we 'see' AUDUSD H4, remember that this sequencer don't need any setting at all, so just switch it to any TF, and 'she' will show 'her' boob.. ops sorry i meant bomb.. lol.

Attached Image (click to enlarge)

now you 'see' that yellow horiz and vertic line is the cross from TF M30 pointing that 'starting curve' of signaling price that i explaining at point 1 above.
In H4 point of view, we see that the next bearish candle also has 'down' bomb signal.. and her curve signal still active right now.

At Point A and B, there are 2 active lines from previous history 'up' signal, and at point C and D you can see 2 active horiz lines from previous history 'down' signal.
so logically AUDUSD will move inside that limit areas..

I hope with my bad English explanation like this, you can still understand what i meant..
keep learning my friend, because this is the best thread to learn the 'real' one.

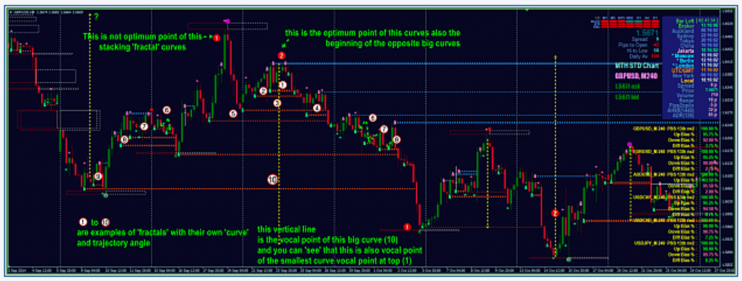
Happy trading and best regards
MTH

Hi My Friend,

Visually you can imagine that every 'prices' are starting point of parabolic curves with their own 'trajectory' there is big curve and small curve and big curve always consist of several small curves until the smallest curves that not trade-able for us (retail traders) but still profitable for HFT companies out there..
this smallest curve that only one 'tick' up and one 'tick' down are 'fractal' that become component or building block of bigger 'fractal' and so on .. to create biggest 'fractal' that need several years elapse time.

This Probability Sub-Sequences is the way to 'mark' where the 'demand' or 'supply' start, it just similar to supply demand indicator, but the important different is, if Supply demand Indicator 'marking' history supply demand areas, while this PSS indicator, mark new supply or new demand, and following 'their' curve until met their counter part (another supply /demand) that will create turning point and move back to their own starting point. (every one of it).

You can see this example of GBPUSD H4 and the explanation about 'fractal' curves;

> *Attached Image (click to enlarge)*
>
> 
>

Of course your probability sub-sequences 'accuracy' calculation will determine the way this 'real' curves appear visually in your chart. The Key is, if the 'starting' point of the curve 'appear' in several time frames in same position, then the probability that this one become 'perfect curve' will be higher.

hope it help and best regards
MTH

My Friend you can search wikipedia for real analysis and sub-sequences and with n=2 that meant both must be in equal length

and 0>1>2 or 0<1<2 is one combination not 2 because it's branching to up or down. 0-1 =-1 1-2 =-1 or 2-1=1 1-0=1 the result is equal.

you miss this 6>6>12

and yes all of sequence is 22 but i don't use 0 > 6 > 12 or 0 < 6 < 12 because with 21 sequences I already reach 100% stage, so no need to sequencing further..

Hope it help and best regards
MTH