Eurusdd's TZ/RZ Clues & Lessons

Firstly I give thanks for the information presented by Eurusdd in the Similarity thread. I take no claim for ANY of these notes. I just find it easier to see them collected into one document **edited** for my own personal clarity. I share to help…that's it. I suggest you read the TZ section starting on page 286 again after understanding becomes clearer. This will bring more value to many post breezed by on your first read, that you could not process.

"I told you people I will leave you with something to think about while I am away till end of October. I am going to post a series of ideas that are used to calculate my probabilities and pick out problem bars".

1

Forex traders are basically dealing with stochastic processes.

STOCHASTIC PROCESSES

Basic notions

Often the systems we consider evolve in time and we are interested in their dynamic behaviour, usually involving some randomness.

- the length of a queue
- the number of students passing the course S-38.143 each year
- the temperature outside
- the number of data packets in a network

A stochastic process X_t (or $X(t)$) is a family of random variables indexed by a parameter t (usually the time).

Formally, a stochastic process is a mapping from the sample space $\mathcal{S}$ to functions of t.

With each element e of $\mathcal{S}$ is associated a function $X_t(e)$.

- For a given value of e, $X_t(e)$ is a function of time ("a lottery ticket e with a plot of a function is drawn from a urn")
- For a given value of t, $X_t(e)$ is a random variable
- For a given value of e and t, $X_t(e)$ is a (fixed) number

The function $X_t(e)$ associated with a given value e is called the realization of the stochastic process (also trajectory or sample path).

Therefore, your success in this game depends on your understanding of stochastic processes, especially discrete ones. It is not necessary that you know these ideas in order to be successful but, if you want to see what people like me see, then you must understand what you are fighting against. Know thy enemy.

Now, since almost everyone on the planet believes, the path of currency prices are random, we shall follow them and use stochastic processes to model our probabilities.

In fact, we shall assume that any two bars on your chart are independent,

that the process has no memory. Even in this case, you can still beat the process.

In the case of forex trading the random variable are the bars on your charts. The feature of the bar you are interested in gives the value of that random variable. So, if you are interested in the close values of the bars, then the process is defined by the closing prices of the bars.

Now that we assumed a random process, what is the best way to win on average? Well, there are many methods on the internet and yet most people struggle to be successful. Well, you don't have to be in that group anymore - if you change your focus.
There are basic features of every stochastic process that can help you get an edge against the process -even if you have no idea of the underlying factors that drive the process : (you are 100% a technical analyst).

It is clear that we are dealing with time-dependent processes, where the feature of the bars you are interested in define the value of the process at any given time.

We can also define the relationship between consecutive bars. It is generally believed that there is no relationship. Let us assume this is true, even though that is not the truth.

Hitting probabilities are very important. In fact, I have demonstrated that here many times. Once you are good at calculating hitting probabilities, you are one step ahead of the rest! You must have a fair idea of which numbers are likely to be hit within a given period.

- Hitting probability: the probability that a given state is $\mathcal{S}$ will ever be entered

- The relationships between X_s and X_t for different times s and t (e.g. covariance or correlation of X_s and X_t)

- First passage time: the instant at which the stochastic process first time enters a given state or set of states starting from a given initial state

$1 million question

Since there are many different stochastic processes, which one is very simple and generally believed to represent forex rates?

Generally, since most people believe that the market has no memory - the past has no say in the present, technical analysis is nonsense - we will follow them and assume that's what we are dealing with

Markov process

A stochastic process is called a Markov process when it has the Markov property:

$$\boxed{\mathrm{P}\{X_{t_n} \leq x_n \,|\, X_{t_{n-1}} = x_{n-1}, \ldots X_{t_1} = x_1\} = \mathrm{P}\{X_{t_n} \leq x_n \,|\, X_{t_{n-1}} = x_{n-1}\}} \quad \forall n,\ \forall t_1 < \cdots < t_n$$

- The future path of a Markov process, given its current state ($X_{t_{n-1}}$) and the past history before t_{n-1}, depends only on the current state (not on how this state has been reached).
- The current state contains all the information (summary of the past) that is needed to characterize the future (stochastic) behaviour of the process.
- Given the state of the process at an instant its future and past are independent.

Example A process with independent increments is always a Markov process.

$$X_{t_n} = X_{t_{n-1}} + \underbrace{(X_{t_n} - X_{t_{n-1}})}$$

the increment is independent of all the previous increments which have given rise to the state $X_{t_{n-1}}$

So, we can assume that we are in the world of Markov chains and according to most people, that is a dangerous place to live. But, believe me, when we are done with this study, you will wonder what happened to yu all these years.... Why didn't you see it..?

Markov chain

The use of the term Markov chain in the literature is ambiguous: it defines that the process is either a discrete time or a discrete state process.

In the sequel, we limit the use of the term for the case where the process is both discrete time and discrete state.

- Without loss of generality we can index the discrete instants of time by integers.
  - A Markov chain is thus a process $X_n,\ n = 0, 1, \ldots$.
- Similarly we can denote the states of the system by integers $X_n = 0, 1, \ldots$ (the set of states can be finite or countably finite).

In the following we additionally assume that the process is time homogeneous.

A Markov process of this kind is characterized by the (one-step) transition probabilities (transition from state i to state j):

$$\boxed{p_{i,j} = \mathrm{P}\{X_n = j \,|\, X_{n-1} = i\}}$$

time homogeneity: the transition probability does not depend on n

In the world of forex trading, the transition probabilities are used to understand how we move from one price state into another.

Remember, I said **you don't need to know what process drives the price!**

There will always be loop-holes. No matter the underlying process.

We do not need to understand everything about Markov chain: What we need for forex trading are the following.

Classification of states (continued)

A set of states is closed, if none of its states leads to any of the states outside the set.

A single state which alone forms a closed set is called an absorbing state

- for an absorbing state we have $p_{i,i} = 1$
- one may reach an absorbing state from other states, but one cannot get out of it

Each state is either transient or recurrent.

- A state i is transient if the probability of returning to the state is < 1.
  i.e. there is a non-zero probability that the system never returns to the state.
- A state i is recurrent if the probability of returning to the state is $= 1$.
  i.e. with certainty, the system sometimes returns to the state.

Recurrent states are further classified according to the expectation of the time $T_{i,i}$ [1] it takes to return to the state:

positive recurrent
expectation of first return time $< \infty$

null recurrent
expectation of first return time $= \infty$

1: It is clear that NO state (price) is absorbing!!!
2: But, and this is important, at any given time, there is a set of states that are transient! We can find them.

3: NOT all forex prices are recurrent.

So, **those problem bars are the ones that contain the KEY transient states (price)**. Once we calculate the time-interval, we can make a call that the process will return to those prices within the time period!!!

Now this is the KEY secret:

No matter the currency pair you are trading, no matter the state of the market, trending, sideways WHATEVER! , there will always be problem bars. There are easy ways to find at least 10 recurrent states per day...

This is the heart of the matter and it works on any time frame. I will prove this to you.

Proposition 1 *[EURUSDD, 2014] Let $X_T(t)$ be a the price of a currency pair at any time t relative to the time-frame T. Then, almost-surely, there exists positive integers k, h such that every price $g \in [X_T(t) - k, X_T(t) + k]$ is $h(T)-$ recurrent.*

Definition 2 *A price $X_T(t_0)$ is $h(T)-$recurrent if whenever $X_T(t_0)$ is between the high and low of a bar in the time-frame T, then at least one of the previous or next h bars passes through $X_T(t_0)$.*

Right now, I will just choose random numbers for h and k and apply it to the pair USDCHF.

Let us choose h=5 - So I will draw a rectangle of length on the daily chart, T=DAILY.

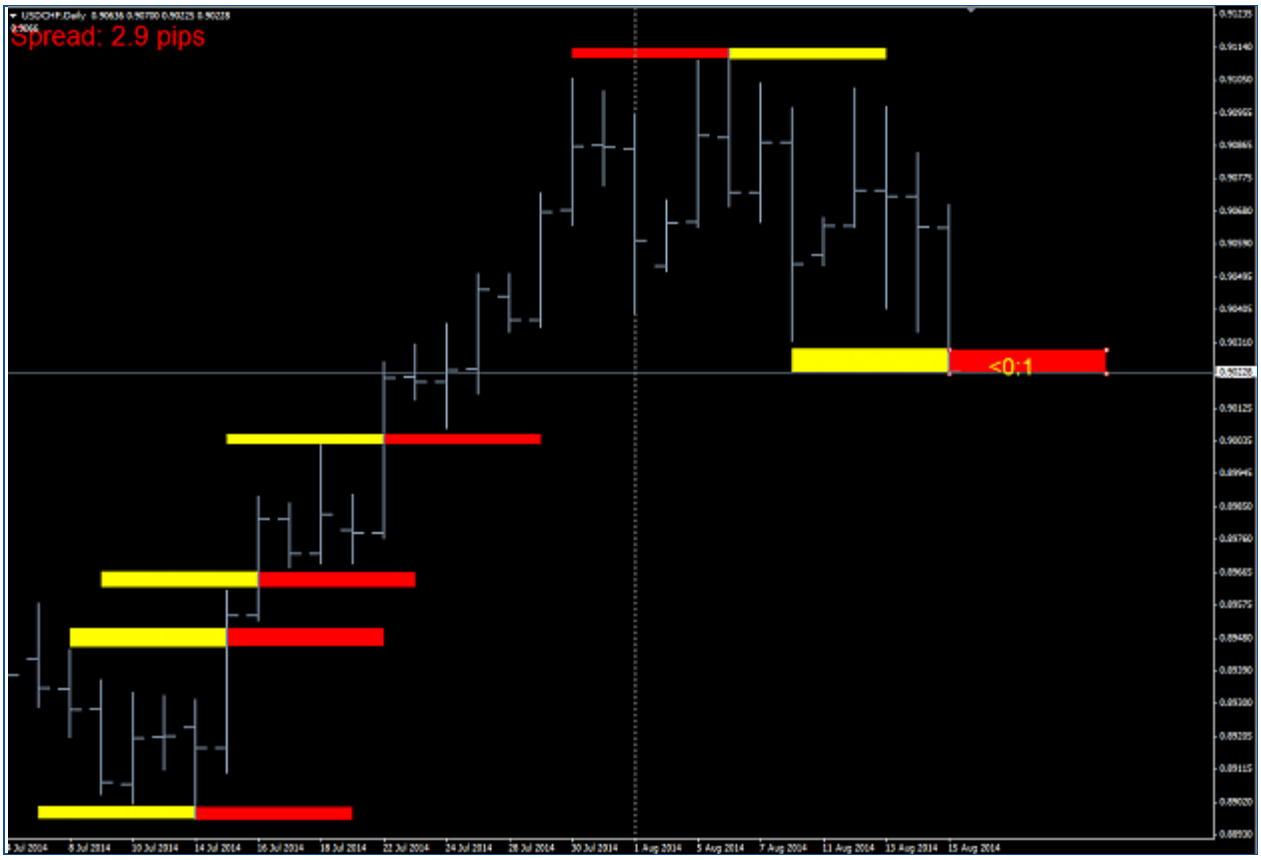
We can then identify the h(T,k)-transient prices!!!

The 5-transient prices are represented by the yellow/red zones. There are very few of them.

The 5 means that within the bars where those prices occur, none of the next 5 bars, behind or in front of the bar in question, passed through those prices.

Now, if you get the h and k right, you will find that transient price-zone occur with very LOW -probability. That is prices are h-recurrent almost-surely

for some positive h.



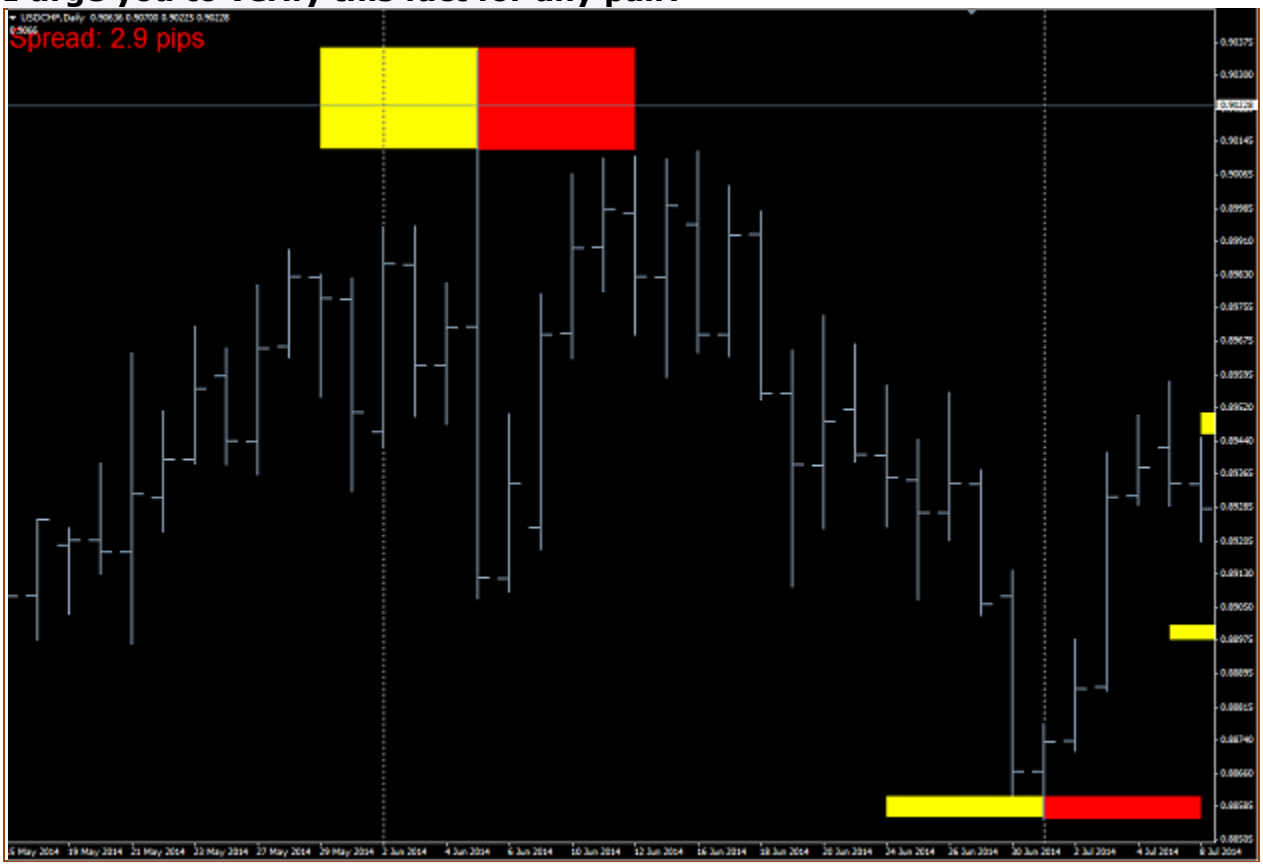
Now if you get the h right for a given time frame and at the current price p, the previous bars never hit p, then probability is on your side for a hit within the next h bars because the probability that p is h-transient is very low.

If your h is right, this probability should be about 3%. That is 97% of the time, at least one of the next h bars should hit p.

This works in theory and in practice for any stochastic process similar to the ones that govern currency prices!!!

Very important!!! If your h is correct, then the height of your rectangle should be very small. This means that most prices choose to be h-recurrent!!!

I urge you to verify this fact for any pair.



Quoting LiquidGenius

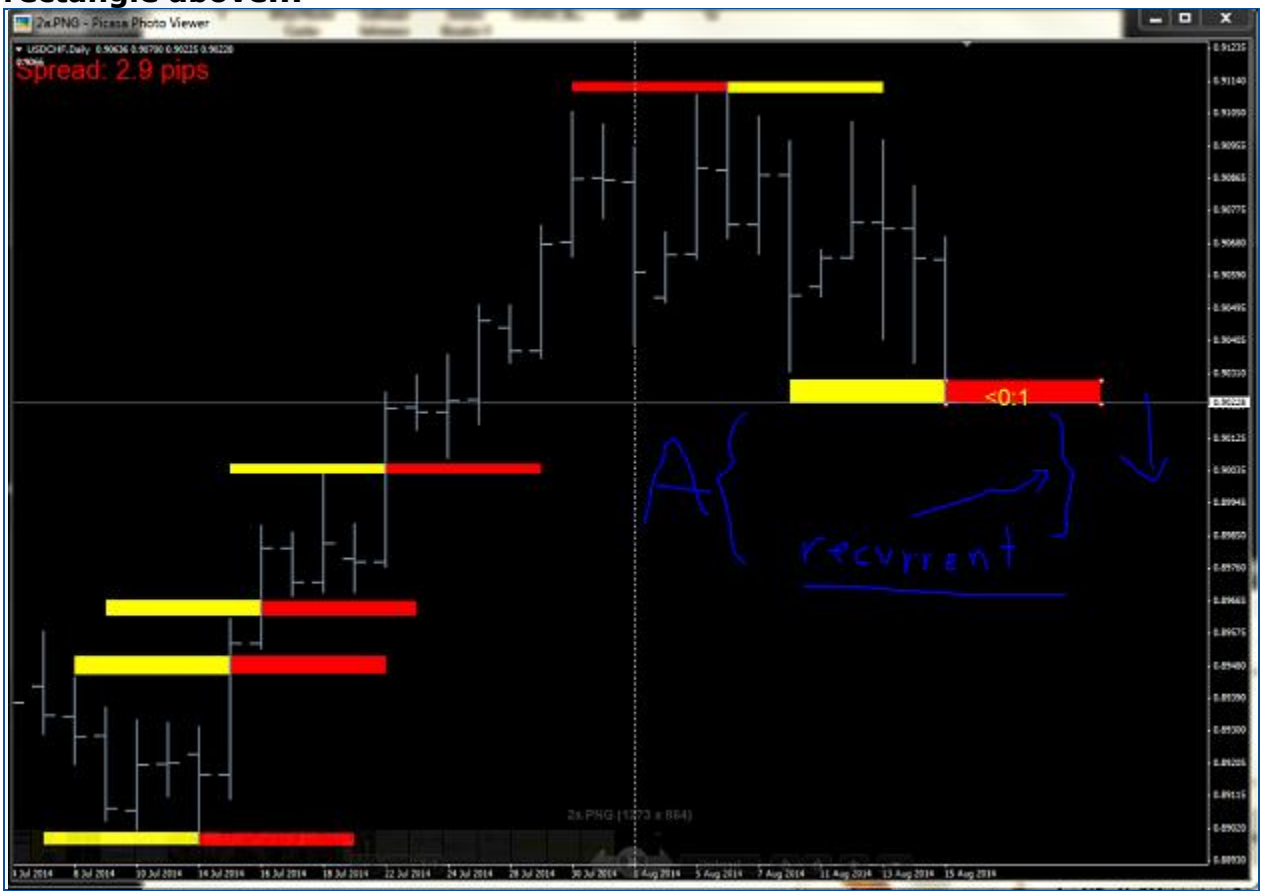
"I believe I see where this is going... I must say I was planning on something similar to this but didn't quite work out how to approach it. You mentioned something interesting about the h/k values which I pondered. Then for a second my mind was blown. Well done hehe"

GOOD liquidgenius. Let me blow your mind now! If a bar has you rectangle then the probability the next one will have a rectangle is 0.00005463% on any time frame. NOW think what that means.....

ONE THING: **$$$$**

One way to use this to your benefit:

since transient rectangles have small heights in general, if price falls into the region A, we can assume we are in a recurrent zone. So prices within the zone A will be hit by at least two bars or price will pull back into the rectangle above!!!



Let me explain one way you can trade this fact. I borrowed this picture from a post above. Now at the current development, he placed a ? mark at the red spot because we do not know if the zone developing will be transient yet. But this is where you can beat the market. Let us suppose that A will be a transient zone, then we can expect that the region just above A must be recurrent. Therefore, once price gets into that region, we are in for $$.

So, all you have to do is estimate a constant value for k, OR let it depend on the current bar. However, in general K should be small!!

If the forces of demand are very close, **almost equal** then there is a way to find the optimal value for k. That is why I trade only eurusd because demand and supply are almost equal. That is the strength of bulls and bears are almost equal in every state of the market.

How you calculate k is up to you. That will differentiate you from another person applying the same principle. **Keep that secret.**

To understand why Technical Analysis rules and you don't really need to know what drives the market, consider the following case.

Suppose I call you one morning and said "XXX the current price of eurusd is 1.3445. Will you buy or sell?"

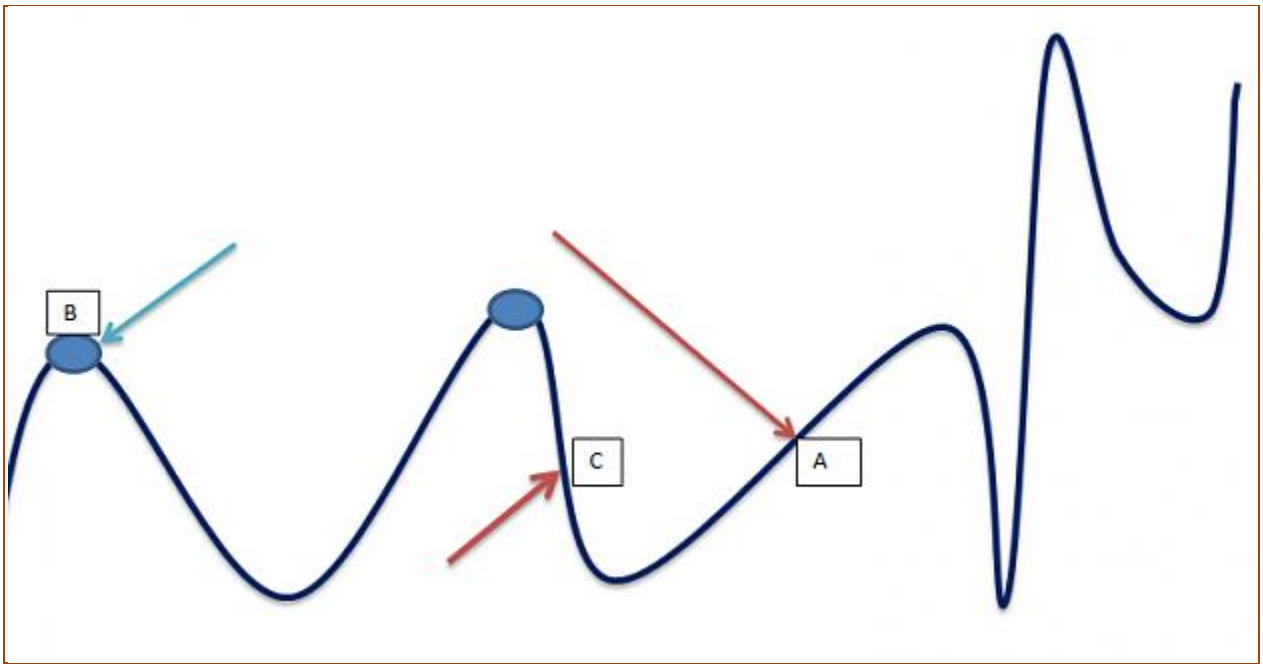
Now, think about this for a moment? If you buy/sell without at least knowing how

price got to the current state, you are gambling!!! Every financial guru, billionaire etc will never place a trade without looking at the history. Even fundamentalists do it all the time. This is because, the way price got to the current state matters and I will explain

It is very important you know how price got to its current state before you buy or sell. In other words, the HISTORY of price does matter.
There are three possibilities.

Consider A. Price was increasing before it got to A and the probability it will continue in that direction is greater than 50%. Why?
Because top and bottoms like B occur with probability less than 1%, if you define a period which is greater than three bars. Check it yourself. Therefore, since the probability that B is a turning point is less that 1%, price is expected to continue to do what it was doing before it got to B.
Price was decreasing before it got to C and since the probability that C is a local maximum or local minimum is less that 1%, price is likely to continue in that direction.

Now, if you do not know what price was doing before it got to A or C, you are silly to buy or sell.



In summary: Believe in technical analysis, not just any analysis but the right one! Believe that there is enough information in the history of price to give you an edge. When you are done, START looking for the right information. I believe I got you started!!!

Notes.

You are not guaranteed longs/Shorts. **What you are guaranteed are re-visits.** That is what you should trade!!! If you suspect a zone to be transient and price moves to a region which will then be recurrent, you can then trade the re-visits. But don't try to buy when price hits the top of the suspect zone because the zone is still forming!!!

You do not know if a region is transient or recurrent yet because it is still forming. What you do though is wait. The moment price goes above that region; you can assume it is transient and then prices very close above it recurrent. Those prices are the ones you will expect a re-visit within at least one of the remaining h bars.

If price goes above a **Zone** before it is done forming, **you can assume the zone is transient and the prices above it recurrent**. Those prices are the ones you will expect to be re-visited, **not the prices in the zone.**

Quoting Dewachen77
" Thanks Eurusdd. Another question: Lets say the white candle is the candle on next Monday (not closing yet). The price goes through region, and the region is now transient (even the candle is not closing yet). The area above it (dark green) becomes recurrent area, right ? So, we are waiting for the price goes far enough (up or down), then we put order with target some where in recurrent area ? Thanks"

Exactly **but only the region above is tradeable**. Let the probability be on your side.

Furthermore, Once you expect a zone to be h-transient, then as soon as price goes above it, assuming the zone is developing at the top, you can declare the area immediately above the zone as h-recurrent and then **look for a sell.**

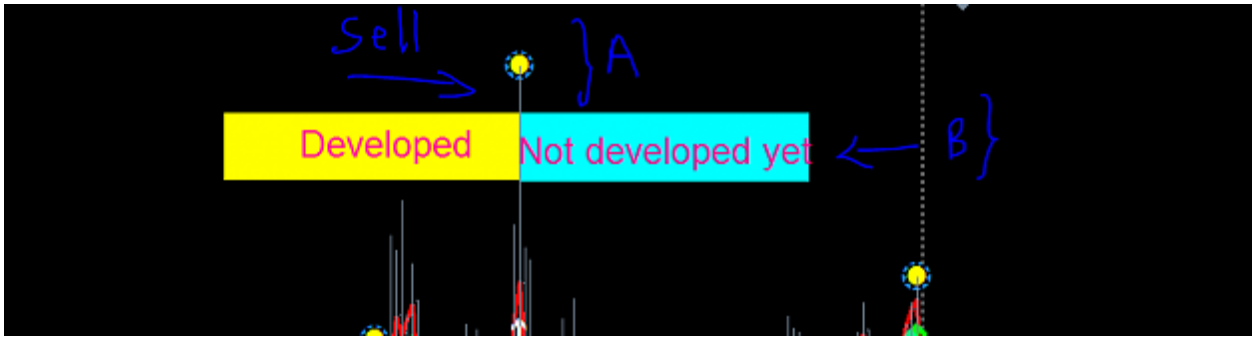
You don't wait. Once the previous h bars give you a hint that a transient zone may be forming, you assume that will be the case and act**!**
(This is where the secret is), riskless profit in **most** cases.
You can declare the area immediately above the zone as h-recurrent and then look for a sell.

The following things will happen.

If your zone turns out to be h-recurrent, your sell will still win,
if your zone turns out to be h-transient, your sell will still win. EITHER way, you will win!!

I leave you to figure this out.

That is why I can win many times without a loss, **even if the pips are small**. I can kill it on every time frame because **whatever the state of the market, I am guaranteed a win, except in exceptional cases, those sample points in zero-measure sets.**



Let us supposed we know the yellow area but the market has not develop the blue area yet. We can then assume that when the region B is matured, it will be transient. So, we declare the area A as recurrent. We then move ahead to find sell position above B.
Now, if the market pulls back into B, we win. If B turns out to be transient, our assumption of A as recurrent will give our sell a profit.
Both ways, we will win!!!

***Prices do not have to return back into* the TZ zone.** Since you assumed it is transient you are not selling with the intention of price returning into the zone. **You are selling with the expectation that price will re-visit the area above the zone.** The other possible option is, you will get more pips because price will not just visit the area above the zone but go down into it as well.

I am trading this microscopically on the 1min 5min timeframes…

Once price is above my h bars, I label that zone a suspect transient zone and start looking for my SURE 1-10 pip **short opportunity** above it, **assuming it is forming up…!! Reverse for longs…**

Focus on the zone price is presently concerned with. The current price should guide you. The whole thing is simple. This and the DNA are the two tools one needs to develop revolution! I gave you people just the idea. You can modify it the way you want. But there are even more powerful things. That, I keep for heaven. Nice weekend.

On average the height of a transient zone is less than 10% of the window size or the price-active region. That is left to you to figure out!!! I will not go into optimal values!!!

97% of the time, the current price going forward wants to be h-recurrent for some h!!! So, there lies you key to $$$.

If you find one instance on your chart where your choice of h or k did not work or price did not behave as you expected immediately, **that is a rare event.** There next instance is most likely to work **SO**, do not raise your hand to the sky cursing the powers that be. Have more confidence that you will not be living to see a rare-rare event. Probability is on your side. **The next instance is good to go…**

I want you to adapt the idea to your own style. **But when you see it the way I do, you will get your Eureka moment.**

All the best!