**PAIRS TRADING: BTC MARCH FUTURE**

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| --- | --- | --- | --- |
| **BTC25H22: Deribit (d)**  AlgoTrader Symbol: BTC25H22  AlgoTrader Account ID:  AlgoTrader Security ID: 14330 | | **BTC0325: FTX (f)**  AlgoTrader Symbol: BTC25H22  AlgoTrader Account ID:  AlgoTrader Security ID: 14330 | |
| MinimumTick(d) = 0.5 | | MinimumTick(f) = 1 | |
| Transaction fee Maker = 0  Transaction fee Taker = 0.05% | | Transaction fee Maker = 0  Transaction fee Taker = 0.05% | |
| Bid(d) | Ask(d) | Bid(f) | Ask(f) |
| 40721.50 | 40734 | 40799 | 40800 |

**Step 1: Calculation**

Buy Signal:

[Ask(d) – Bid(f)] - SMA(P(d) – P(f), t) = alpha

If alpha <= -(Entrythreshold -1)

Buy BTC25H22 from Deribit and Sell BTC0325 from FTX)

Sell Signal:

[Bid(d) – Ask(f)] – SMA(P(d) – P(f), t) = alpha

If alpha >= Entrythreshold -1

Sell BTC25H22 from Deribit and Buy BTC0325 from FTX)

*P: mid-point-price of orderbook*

*t: to be backtested (e.g. 1000 seconds)*

*Entrythreshold: a constant with a minimum value of 50 (initially), to be adjusted in backtesting (a trade-off between trading opportunities and profitability per trade)*

**Step 2: Entry position *(Assume no liquidity issue at this stage)***

Assume we would like entry threshold to be N (50)

**Buy Signal**

when alpha <= -(N-1) or (-49), place

Order1: Limit Buy Order of BTC25H22 from Deribit with Price(d)= Bid(d) - MinimumTick(d)

Order2: Limit Sell Order of BTC0325 from FTX at Price(f) = Ask(f) + MinimumTick(f)

If both filled at the same time, close condition

If one filled, the consider the following situations: >>>>>>>new tick

if the Buy order is filled, then:

if Bid(f) <= Bid(d), then we close the Buy position at market price of Bid(d)  
else we amend the Sell order price to Bid(f) (i.e. market price)

if the Sell order is filled, then:

if Ask(d) <= Ask(f), then we close the Sell position at market price of Ask(f)  
else we amend the Buy order price to Ask(f) (i.e. market buy)

If both not filled, reassess the situation after t= 1 second and adjust price (Loop from Step 1, if alpha <= -(N-1) or (-49), readjust Price(b) and Price(f) based on current Bid(d) and Ask(f). if alpha > -(N-1) or (-49), cancel orders.) <<<<<<<<cancel anyway

**Sell Signal**

if alpha >= N-1 or 49, place

Limit Sell Order of BTC25H22 from Deribit with Price(b)= Ask(d) + MinimumTick(d)

Limit Buy Order of BTC0325 from FTX at Price(f) = Bid(f) - MinimumTick(f)

If both filled at the same time, close condition

If one filled, the consider the following situations: >>>>>>>new tick

if the Buy order is filled, then:

if Bid(f) <= Bid(d), then we close the Buy position at market price of Bid(d)  
else we amend the Sell order price to Bid(f) (i.e. market price)

if the Sell order is filled, then:

if Ask(d) <= Ask(f), then we close the Sell position at market price of Ask(f)  
else we amend the Buy order price to Ask(f) (i.e. market buy)

If both not filled, reassess the situation and adjust price (Loop from Step 1, if alpha >= N-1 or 49, readjust Price(b) and Price(f) based on current Ask(d) and Bid(f). if alpha < N-1 or 49, cancel orders.)

**Step 3: Close Position**

**Close Buy Position** when Position > 0 and alpha crossover -1 from below:

Limit Sell Order of BTC25H22 from Deribit with Price(b)= Ask(d) + MinimumTick(d)

Limit Buy Order of BTC0325 from FTX at Price(f) = Bid(f) + MinimumTick(f)

>>>>>>>new tick

If both filled at the same time, close condition

If one filled, amend the other and get executed straight away.

If both not filled, reassess the situation and adjust price. Loop from Step 1

If alpha >=-1, readjust Price(b) and Price(f) based on current Bid(d) and Ask(f).

If alpha <-1, cancel orders.

**Close Sell Position** when Position < 0 and alpha crossover 1 from above:

Limit Buy Order of BTC25H22 from Deribit with Price(b)= Bid(d) - MinimumTick(d)

Limit Sell Order of BTC0325 from FTX at Price(f) = Ask(f) + MinimumTick(f)

>>>>>>>new tick

If both filled at the same time, close condition

If one filled, amend the other and get executed straight away.

If both not filled, reassess the situation and adjust price. Loop from Step 1:

If alpha <=1, readjust Price(b) and Price(f) based on current Bid(d) and Ask(f).

if alpha >1, cancel orders.

To be tested: Are we closing at alpha = 0, or closing at opposite signals?

* More trading opportunity, less profitability per trade (as $25-50 transaction fees per round trade)
* ? Easier position and wallet balance control (No need to move fund from each to the other often)
* What is the mean reversion window?
* What is the trading frequency?
* What is the ratio of Signal Buy vs. Signal Sell?
* How is the Signal Buy and Signal Sell distributed over time?

**Step 4: Quantity and Balance Control**

* To make sure no liquidation price +/- 40% => leverage ratio 2.5x
* Balance of trading profit on each size so we don’t need to move funds regularly
* Moving fund when one wallet balance <50% the other balance

Trading quantity = 2.5\* Lower [Ballance(d), Balance(f)]

? If Balance(d) < 55% Ballance (f), execute Only Buy Signals until Balance(d) > 65% Ballance (f)

? If Balance(f) < 55% Ballance (d), only execute Sell Signals until Balance(f) > 65% Ballance (d)