

A price is not a number. Show me a system that trades both ways using a price defined as a single number and I will show you a strategy to bankrupt it. At the very least, it is two

numbers: a bid and an ask.

But this is also a simplification. When you ask for a price, you're always implicitly asking for a quantity too. Perhaps something like "what would be the price if we liquidated 10% of all of a certain collateral type".

A price is a pair of cost-curves. In reality, these curves are composite of many different cost curves that are in constant flux. Imagine what an order book looks like, the different shapes you observe in the wild.

Perhaps there is a reasonable model that is good enough, in the sense that it can be used to answer the questions "how much can we sell with a max slippage of X" and "how much would the price move if we tried to sell Y".

I don't know the right model to use, but I can offer a suggestion: A simple quadratic curve. Deep order books look suspiciously like square roots, and quadratic costs show up all the time in these mechanisms. But maybe it's not a square root shape but $\log(x)$

or maybe that's just an illusion and it's not concave at all but convex. You tell me. My head is spinning already.

We can use all the different AMM curves as a starting point.

I also insist that a bid and an ask should be expressed as two different asks in opposite basis units.

Instead of

ETH/USD: p

we might see

ETH/USD: $ax^2 + bx + c$

and

USD/ETH: $dx^2 + ex + f$

.

So a 'price feed' still submits just a few data points (a, b, c).

x

is the quantity. If you want the point price, use $x=0$

, the c

and f

are your bid and ask (modulo mixing up the orientations – you know what I mean).

Who has some better insights into this? Let's push the space forward a bit and discourage using single point prices where they don't make sense.