Superposition Futarchy: Conditional Execution via Market-Based State Collapse

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July 2025

Abstract

We present a novel form of futarchy where conditional outcomes exist in superposition until resolved by market consensus. Upon initiation of a futarchy proposal all proposed token actions are minted and performed immediately with conditional tokens. These tokens trade freely until being resolved by highest reading the Time-Weighted-Average-Price. The protocol operates on a state budget rather than limiting concurrent events, allowing flexible combinations (e.g., the Cartesian product of 4 binary events or one 16-outcome event within a 16-state budget).

1 Immediate Conditional Token Creation

- Current implementations of futarchy allow users to create proposals for a company treasury to transfer spot tokens to an address when if the proposal passes [1]. Assuming the proposal measuring period is X seconds. This creates X seconds latency between decision proposal and decision actions. This has an opportunity cost of :

$$C = V \cdot X \cdot r \tag{1}$$

where:

$$\begin{aligned} C &= \text{Opportunity Cost} \\ V &= \text{Value to Transfer} \\ X &= \text{Latency (in seconds)} \\ r &= \text{Market Interest Rate} \end{aligned}$$

Immediate transfers offer immediate capital utility.

- In Superposition futarchy if Alice creates a proposal for company B to pay her 1000 USDC to do work. She immediately get sent 1000 Accept-USDC. This will only be redeemable for 1000 spot USDC if the proposal passes. So she both does and doesn't get paid. The decision markets collapse the superposition to one of the options.

- This is a useful abstraction that allows a futarchy treasury to atomically buy back or dilute its own stock when it is trades below or above net asset value, without being front run. MntCapital an onchain fund had significant friction with buy backs [2]. This requires deep conditional liquidity, which a futarchy AMM provides [3].

- Conditional tokens trade freely until resolution. This helps the market to more fairly price and token actions.

2 Superposition states budget

- Current leading implementations of futarchy allow for N outcomes markets [1]. Other proposal will not share the same liquidity.
- Using carteasian product of all verses and their partitions
- State expansion as proposal are added to state space.
- Superposition: multiple states exist simultaneously
- States collapse as proposals resolve
- New proposals enter freed slots
- Continuous pipeline of decisions
- Liquidity preservation across transitions
- Pruning impossible combinations
- Lazy evaluation of state transitions

3 References

1. https://www.govex.ai/
2. https://metadao.fi/mtncapital/trade-v4/CV5gPgHMyJQV3a9m5FZnAxvRXsAn65dMScsANTCydHrX
3. https://x.com/metaproph3t/status/1930686351680409637