Sigmadex

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Abstract

Sigmadex proposes a community driven DeFi protocol with heavy focus on gamification through NFTs and the implementation of cutting-edge mathematical modelling. These models are represented as "Sigma Curves" and integrate into the SDEX ecosystem for the purpose of stabilization while adopting a long-term growth strategy. The Sigmadex protocol utilizes an upgradable infrastructure based on the EIP-2535 Diamonds, Multi-Facet Proxy architecture and represents a possible Derivatives 2.0 type market through its NFT gamification layer. By aligning incentives using dynamic LP farms, utility NFTs, staking and an elastic token supply, the SDEX token is engineered with creativity, community and sustainability in mind.

1 Motivation

Sigmadex seeks to remove the fear and uncertainty individuals often describe when using traditional DeFi products. By creating a transparency model derived from mathematics we remove the ability for users to be cheated out of a fair chance by others with a larger vested interest. We propose the integration of game theory into every aspect of the protocol giving users a new experience with every interaction. By having a non traditional ecosystem, users have the capability to experiment with new strategies however they feel necessary. In short, we are giving the power back to the community and allowing them to control their own narrative through multiple DeFi opportunities.

Derivatives 2.0 is the moniker we have created to reflect the abundance of features integrated into Sigmadex. While traditional markets have futures, options, mutual funds and bonds, Sigmadex's focal point is on utility NFTs which work in conjunction with gamification, time-locked staking pools and penalty/reward curves.

The Sigmadex motivation stems from solving real world issues in DeFi, these known problems which plague the space include but are not limited to:

1. Lack of economic stabilization
2. Rug pulls due to inadequate liquidity commitments
3. Insufficient incentives across all playing fields

Sigmadex proposes economic balancing primarily through game theory elements and dynamic staking models that originate through community governance. We propose various theories to allow the protocol to change its parameters for reaching an equilibrium state when faced with an imbalance. By being adaptive, boundless liquidity will be achieved through time-locking incentives, transparency and penalties when commitments are violated. Creating the necessary motivations to keep users vested in Sigmadex is a key component to a healthier token ecosystem and helps regulate proper behaviours.

2 SigmaFi

SigmaFi Smart Contracts are critical balancing components to the SDEX ecosystem. There are several community driven aspects to these elements which enable everyone to make decisions on incentivizing continued protocol participation.

2.1 SDEX Strategy Pools

Strategy Pools are proposed through governance and can be deployed in various forms, by depositing SDEX into Strategy Pools, rewards can be earned based on the individual contract parameters.

2.1.1 Liberty Pools

The Liberty Pools are designed to work in conjunction with APY NFTs which are minted by SDEX stakers. To participate in Liberty Pools, an NFT owner will require an APY NFT accompanied by SDEX to earn further yield in relation to the NFT's APY.

eg. John sees a strategic opportunity to stake 100 SDEX tokens in a Liberty Pool and attaches his 20% APY NFT. After time elapses and his contract matures, he removes his stake and receives his initial 100 SDEX plus an additional 20 SDEX.

The contract parameters for this specific pool are outlined below:

var	type	val
requireNFT	bool	1 (true)
compounds	bool	0 (false)
stakeLen	uint8	365 (days)
tokenMax	uint8	10000000

`requireNFT` An APY NFT is required to stake SDEX in this specific pool
`compounds` This specific Liberty Pool does not compound rewards
`stakeLen` This is a total time commitment duration to reach full maturity
`tokenMax` This is the amount of sSDEX that can be staked in this pool

2.1.2 NFT Minting

Users can deposit SDEX into the minter contract in order to mint Liberty Pool APY NFTs. These APY NFTs can be attached with an SDEX stake to earn an APY NFT. With a larger and longer commitment, less SDEX staking is required to mint a higher APY NFT.

Proposed minting variables are below:

- Every sSDEX staked adds 0.00001% daily
- Longer time commitments (730 days+) add a 2x multiplier
- Upon unstaking, NFTs are minted and sSDEX tokens are converted back to SDEX

eg. John wants to mint a 110% APY NFT for use in a Liberty Pool at a later date. In order to achieve this he stakes 30,000 SDEX for a period of 365 days.

We can calculate the value of the APY NFT based on the following proposed formula:

$$r \cdot t \cdot deposit = z$$

var	desc
r	Rate of Increase
t	Time (Days)
$deposit$	Amount Staked

We substitute the rate of daily growth per sSDEX staked, multiplied by the amount of days and then again by the amount of tokens:

$$0.00001 \cdot 365 \cdot 30,000 = 109.5$$

We can conclude that after 365 days, an NFT for 109.5% APY can be minted by staking 30,000 SDEX for a 1 year hold.

2.1.3 Solo Pools

Users can deposit SDEX or sSDEX into independently created pools to earn yield based on integrated parameters. Various pools will be created with different mathematical models to ensure appropriate rewards and penalties are in-line for user action.

2.2 LP Strategy Pools

Depositing LP tokens from various protocols into LP focused Strategy Pools offer different options for earning yield in different forms. Sigmadex has a goal of becoming a top DeFi protocol through TVL[1] and adoption of multiple DEX platforms. Since the Sigmadex core focus is on gamification, we can naturally conclude our competition is not other decentralized exchanges.

Sigmadex proposes variations of the following strategies:

[1]Total Value Locked

1. NFT Farming

   No Penalties

   No Fee Swaps

   Fixed APY NFTs

   No Slippage Swap

2. Liquidity to SDEX Transformation

   Enables boundless liquidity for SDEX

3 Penalties/Rewards

3.1 Penalties

Depending on the strategy pool or smart contract implementation, a penalty can occur when fulfilment doesn't align with contract parameters. This typically happens when a user makes a committed stake for a certain period of time but decides to pull out before the contract has matured.

3.2 Rewards

Rewards are generated by following through with time-lock commitments. When a contract has matured successfully or sufficient time has elapsed into a reward period, sSDEX will be minted to the user.

4 Sigma Curves

Sigma Curves were created as the backbone for incentivzations and has multiple ways of implementation. It is based on the following regression[2]:

$$A\left((1-y_0)\cdot\left(1-i^{(-x)}\right)\cdot\left(\frac{1}{1-i^{-t}}\right)+y_0\right)$$

var	**desc**
A	Amplitude
i	Curve
t	Days (Time)
y_0	Starting Point

The core components of this formula can be expressed in multiple ways through modifications to the above variables. By adjusting these elements we can alter the curve to fit our desired model as seen in Figure 1 above.

[2]Sigmadex Introduces Sigma Curves - https://blog.sigmadex.org/sigma-curves

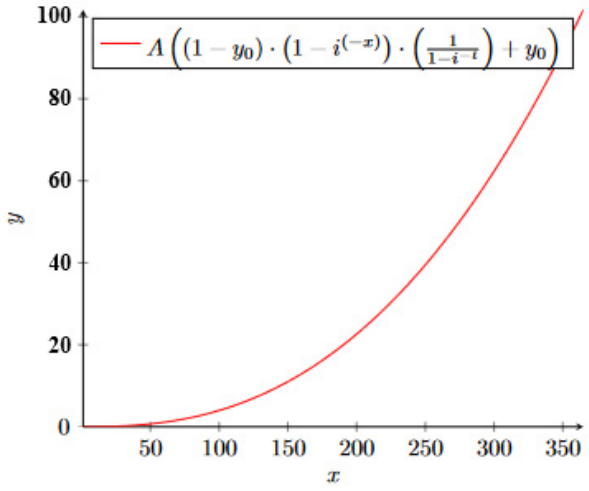

Figure 1: Sigma Curve favoring the top end of a contract

5 Governance

The Sigmadex protocol is governed and overall enhanced by SDEX token-holders. By utilizing the following three elements:

- Governance forum,
- SDEX token,
- Votelocking;

Together, these modules allow the community to propose, vote, and implement changes through fair governance. Proposals can modify system parameters, support new markets, or add entirely new functionality to the protocols foundation layer through the Diamonds architecture (EIP-2535) for the purpose of protocol improvements. [3]

6 Native Token

The SDEX tokens have several use cases:

Sigmadex (SDEX) is an ERC-20 asset that empowers community governance of the Sigmadex protocol operating on the Avalanche network. SDEX token-holders themselves or elected delegates can discuss, debate, propose and vote on all changes or enhancements to the protocol using the token. SDEX is also used as a staking token in minting NFTs and can also serve as collateral for its mathematically driven smart contracts to create rewards through supply inflation.

[3]Diamonds, Multi-Facet Proxy - https://eips.ethereum.org/EIPS/eip-2535

Staking allows SDEX to be passively earned through SigmaFi smart contracts. By staking your SDEX with Sigmadex, you receive sSDEX (staked SDEX) in return at an even 1:1 ratio. After that, your sSDEX balance will increase automatically based on the Sigma curve attached to the strategy pool your tokens are deposited into. Rewards are minted based on independent smart contract parameters.

6.1 SDEX

The SDEX token is the liquid form of the Sigmadex native token. It can be bought or sold on either a centralized or decentralized exchange. SDEX can be transformed into sSDEX as "staked SDEX" and deposited into SigmaFi Strategy Pools to earn yield or mint protocol NFTs.

6.2 sSDEX

The sSDEX token represents SDEX which is locked in the Sigmadex ecosystem. It is an illiquid asset designed to represent a "staked" status for SDEX which cannot be immediately sold into the open market. By separating SDEX and sSDEX we are able to govern and balance the protocol accordingly by having a global perspective on total circulation.

7 Swapping Architecture

Sigmadex proposes a DeFi oriented token swapping architecture which provides end users with usage benefits through non-traditional means.

7.1 NFT Integration

NFTs may be attached with performing swaps to reduce or eliminate transactions fees, reduce slippage and earn from global protocol usage. We propose exploring self-destructing NFTs after certain uses to retain novelty factor. Ultimately governance will guide the NFT parameters to a stable state.

7.2 DAMM/Impermanent Loss

Sigmadex proposes a Dynamic Automated Market Maker (DAMM) for mitigating IL through implied volatility and proactive transaction fee adjustments.

By utilizing implied volatility instead of explicitly calculated volatility we expect Sigmadex to proactively raise the transaction fees to counteract arbitrage opportunities, in behaving this way we are able to keep liquidity pools balanced and use any potential arbitrage for a positive outcome. Dynamic and varied transaction costs help create healthy arbitraging opportunities that benefit the Sigmadex ecosystem. This is done through adjustments to the buy/sell fees for each token independently to each liquidity pair. Arbitrageurs provide value by balancing the liquidity pair through incentives to buy/sell a token that has diverged away from the other with a more attractive swapping fee on the side that is encountering imbalance.

8 Conclusion

Sigmadex is a protocol that was created and designed with mathematical precision to introduce an everlasting token ecosystem that provides adequate incentives for all parties that are involved. No bias towards DeFi or liquidity provisioning, there is always balance - We introduce game theory inspired functionality that delivers utility for SDEX and sSDEX to accommodate all temperatures of risk for any style of user of the protocol. With a low barrier of entry and plenty of education, Sigmadex seeks to attract every type of user with a multitude of ways to get involved. NFTs have been a revolutionary product in the crypto industry and we've taken the opportunity to elevate their use case and provide unique functionality within the protocol. Instead of owning a one dimensional asset, Sigmadex proposes NFTs that can be acquired through different strategies. The process of obtaining utility APY multiplier NFT's generates the ability for users to further enhance and excite their experience while ensuring each Sigmadex encounter is different from the previous.

When we think about a traditional Decentralized Exchange we think of Swaps and Farms; The purpose of Sigmadex is to introduce a different ideology with utilities to remove the monotony and create a product that is complete with new ways to get involved and reinvigorate the dull experience with true gamification. The Sigma Curve has no bias - there is a risk and reward benefit for every action an individual takes and that choice is up to the user which makes the strategy modelling limitless; and therefore creating a protocol with sustainability at its core.