



COMPREHENSIVE REPORT ON ALGORITHMIC STABLECOIN MODELING AND LIQUIDITY PEG MECHANISMS

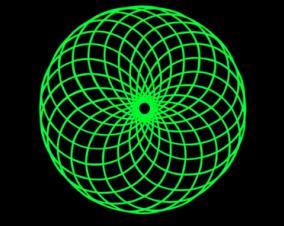
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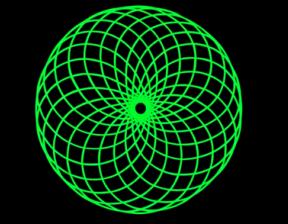
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2. MULTIVARIATE GEOMETRIC BROWNIAN MOTION (MGBM)

$$dS_t = \text{diag}(S_t) \cdot (\mu dt + \Sigma dW_t)$$

- S_t : Asset price vector
- μ : Drift rates
- Σ : Volatility-covariance matrix
- dW_t : Wiener processes
- *Simulates FX, commodities, and treasuries.*

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3. COMPOUND INVESTMENT OF INDIVIDUALS AND COMMUNITIES (CIIC)

$$y = i \cdot \left(1 + x + \frac{r}{n}\right)^{nt}$$

y: Final compounded value

i: Initial capital

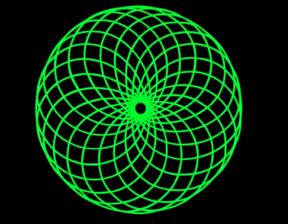
x: Contributors

r: Interaction rate

n: Transaction count

t: Time unit

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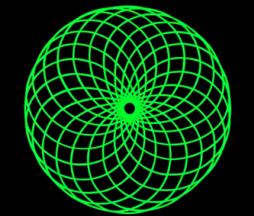


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4. ROLLING TREASURY ADJUSTED BANK RATE (RTABR)

$$\text{RTABR} = \frac{\sum T_y \cdot (\sum R_c/N)}{\sum T_y/N}$$

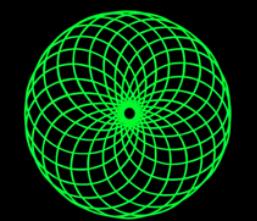
- T_y : Treasury yields
- R_c : Central bank rates
- N: Number of economies



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5. GLOBAL LIQUIDITY UTILIZATION (GLU)

$$\text{GLU}(t) = \frac{L_{\text{active}}(t)}{L_{\text{potential}}(t)}$$

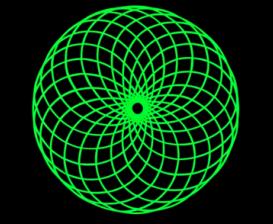


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6. UNIFIED PEG FUNCTION

$$POICD(t) = 1.00 + \alpha \frac{d}{dt} \left[\frac{GLU(t) \cdot RTABR(t)}{GDI} \right] + \beta \frac{d}{dt} [FX_{\text{weight}}(t)]$$

- Clamp: $0.96 \leq POICD(t) \leq 1.04$
- GDI: Global Debt Index = Mdebt/GDP

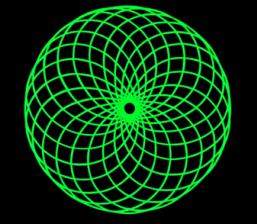


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7. ELASTIC PEG WITH VOLATILITY OSCILLATION

$$P_{\text{elastic}}(t) = P_{\text{OI}CD}(t) + \sin(\sigma_{\text{vix}} t)$$

- Smoothed with Navier-Stokes dampener.

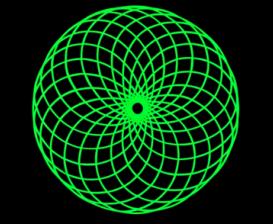


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8. LIQUIDITY DEMAND & SUPPLY PEG DERIVATIVE

$$\frac{dL}{dt} = \delta(M_{\text{unmet}} - L_{\text{issued}}) + \eta \cdot \text{Volatility}$$

- Triggers auto-mint/burn based on supply-demand mismatch.

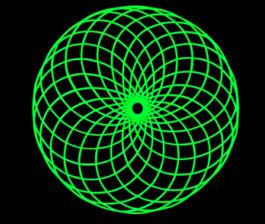


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10. FINAL LIQUIDITY PEG FUNCTION

$$P_{\text{liq}}(t) = \frac{1}{\text{GDI}} (\text{GLU}(t) \cdot \text{RTABR}(t) + \sigma_{\text{FX}} + \sigma_{\text{commodities}}) \cdot \text{smooth}(\text{Navier-Stokes})$$

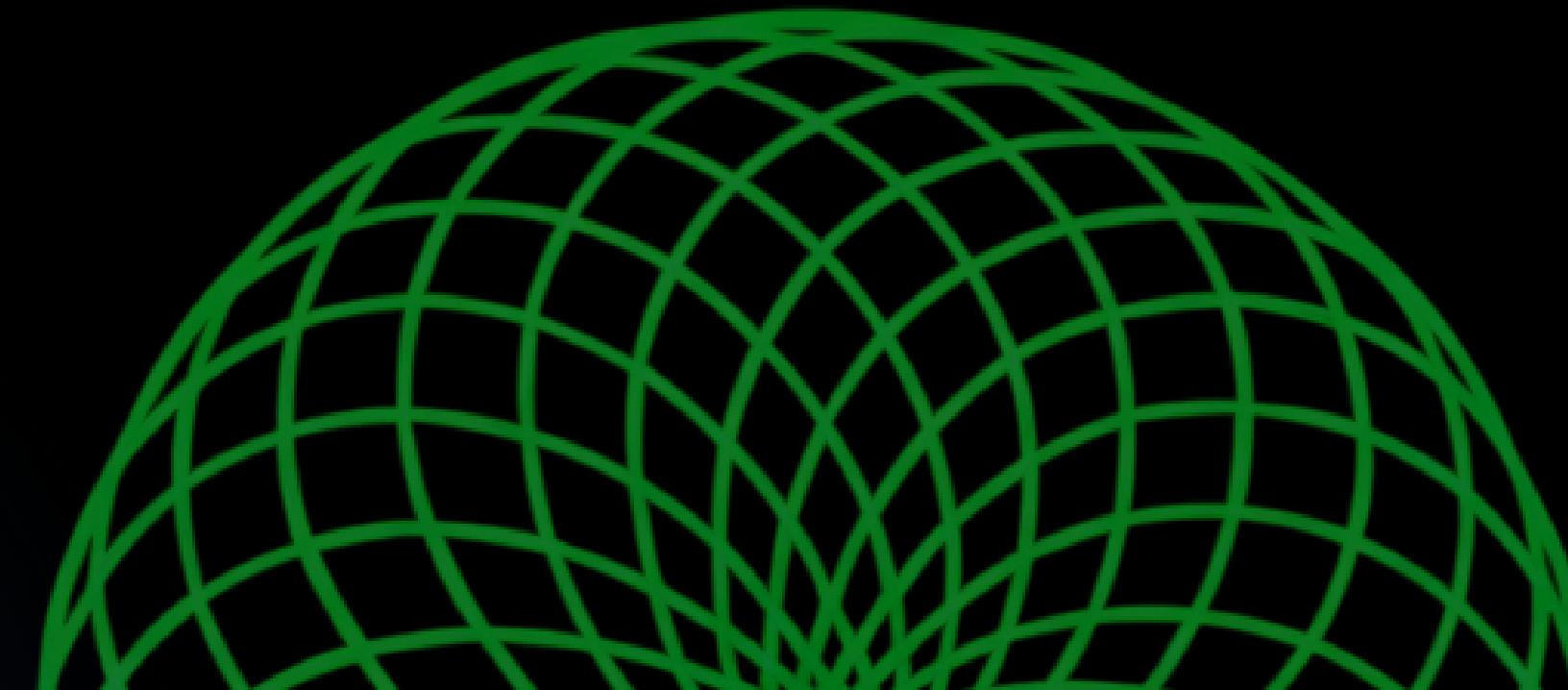
- Captures nonlinear feedback and noise.



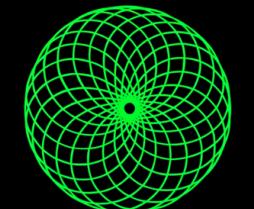
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11. ITO INTEGRAL WITH MGBM AND VAN DER POL DYNAMICS

$$dX_t = \mu X_t dt + \sigma X_t dW_t + \epsilon(a - \beta X_t^2)X_t dt$$

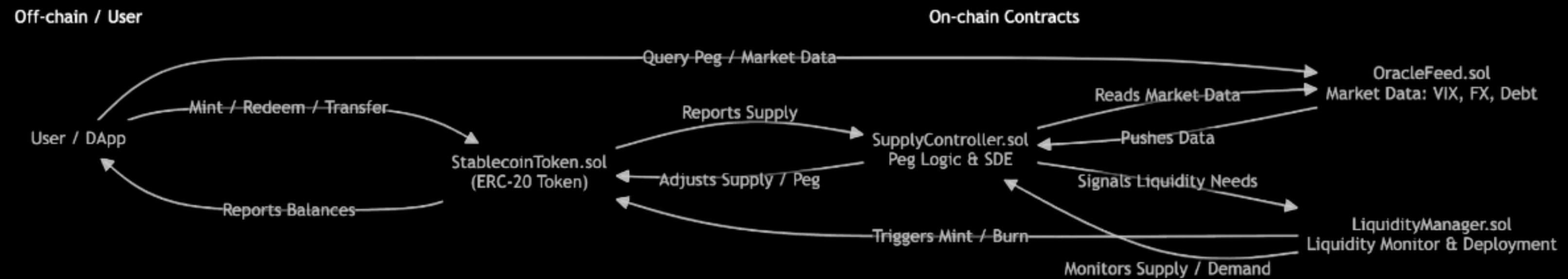


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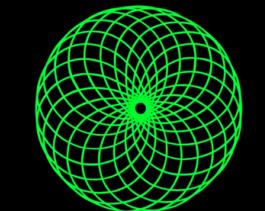


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12. SYSTEM ARCHITECTURE



- **StablecoinToken.sol:** ERC-20 Standard
- **SupplyController.sol:** Peg logic & SDE adaptation
- **OracleFeed.sol:** Real-time market data (VIX, FX, debt)
- **LiquidityManager.sol:** Monitors and deploys liquidity



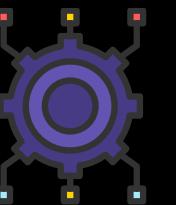
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13. USE CASES

- Global trade & cross-border private credit



- Algorithmic arbitrage (commodity pegs vs. fiat)



- Synthetic debt instruments (sovereign volatility)



- Reserve pool for distressed liquidity zones

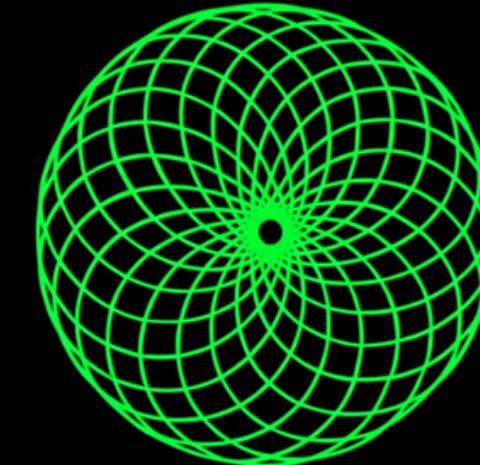


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A GROUNDBREAKING SYSTEM FOR SYNTHETIC RESERVE CURRENCIES IN A FIAT-HYBRIDIZED ECOSYSTEM. DYNAMIC SUPPLY CONTROL, STOCHASTIC NOISE BALANCING, AND MACROECONOMIC ANCHORING ENABLE RESILIENCE, GLOBAL SIGNAL ABSORPTION, AND A BRIDGE BETWEEN PRIVATE CAPITAL AND SOVEREIGN POLICY.

THANK YOU!

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