

# Curve.fi

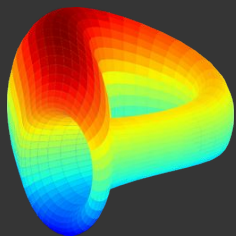
deep on-chain liquidity using  
advanced bonding curves

やさしくないDeFi by udon.eth



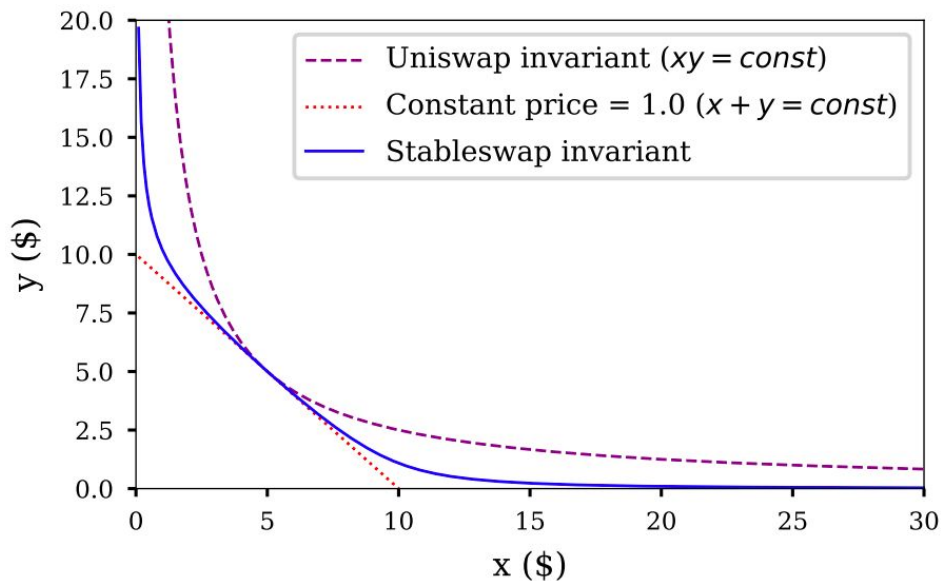
# Uniswap(AMM)の仕組み

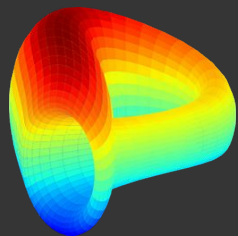
- Uniswapの仕組み:  $X \times Y = K$  (定数) を維持するようにして価格決定及び交換を実現
- 例)  $(X + a) \times (Y - b) = K$   $a$ はぶつけられたトークンの量、 $b$ は出ていく量



# StableSwap - advanced bonding curve

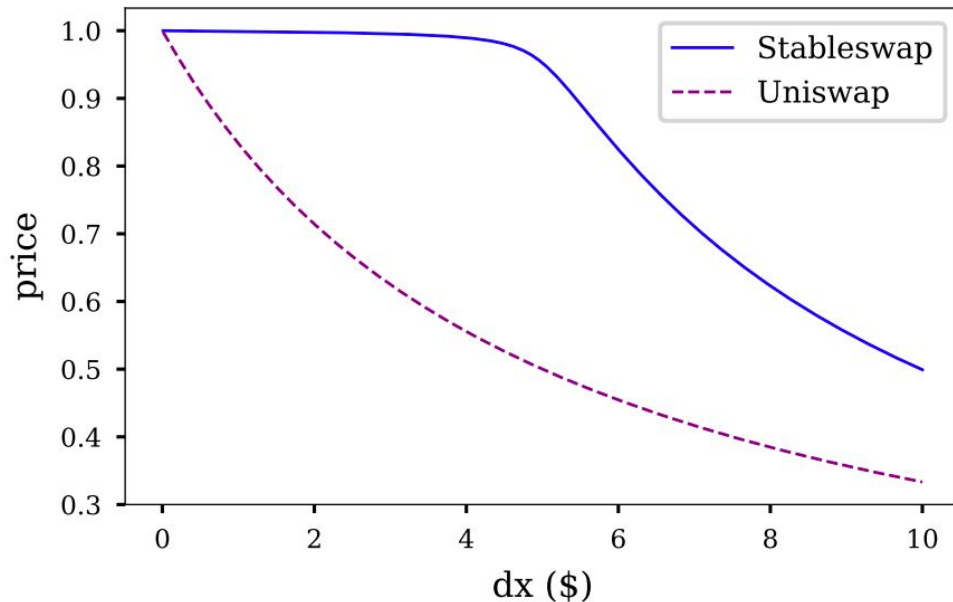
- 本来Stableなペア同士なら、 $X + Y = K$ に近くても良いのでは?  
(ちなみに:  $X + Y = K$ を採用しているのがmStable)





# StableSwap - advanced bonding curve

- 本来Stableなペア同士なら、 $X + Y = K$ に近くても良いのでは？



## Currency reserves

DAI: 97,587,876.74 (31.48%)  
USDC: 103,730,516.97 (33.46%)  
USDT: 108,714,460.24 (35.07%)  
DAI+USDC+USDT: 310,032,853.96

Fee: 0.040%

Admin fee: 50.000% of 0.040%

Virtual price: 1.0075 [?]

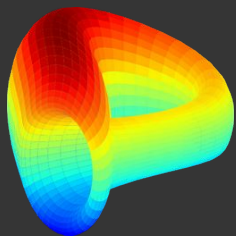
A: 200

Ramping up A: [?] 100 -> 200

Ramp up A ends on: 19/10/2020 18:46:30

Liquidity utilization: 15.91% [?]

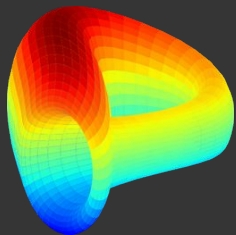
Daily USD volume: \$49,340,768.84



# Curve.fiのPoolについて


- Poolがたくさんあるが、それらはveCRVによるガバナンスにより決定される (CRVについては後述)
- 現在あるStable系については
  - USD
  - BTC
  - ETH
  - EUR

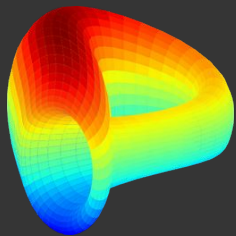
Curve pool \$			
0. Compound [(cDAI, cUSDC)]	APY:10.05% +18.93% to 47.33% <span>↑</span> CRV	Vol: \$4,343,139	
1. USD [(cDAI, cUSDC, USD)]	APY:5.63% +7.53% to 18.83% <span>↑</span> CRV	Vol: \$174,943	
2. PAX [(yDAI, yUSDC, yUSDT, PAX)]	APY:0.97% +21.47% to 53.69% <span>↑</span> CRV	Vol: \$142,338	
3. Y [(yDAI, yUSDC, yUSDT, yTUSD)]	APY:7.59% +22.55% to 56.86% <span>↑</span> CRV	Vol: \$13,345,759	
4. BUSD [(yDAI, yUSDC, yUSDT, yBUSD)]	APY:6.94% +25.39% to 56.47% <span>↑</span> CRV	Vol: \$1,146,011	
5. sUSD [DAI, USDC, USDT, sUSD]	APY:1.73% +7.67% SNX +18.89% to 47.22% <span>↑</span> CRV	Vol: \$18,626,820	
6. ren [(renBTC, wBTC)]	APY:0.33% +2.52% to 6.31% <span>↑</span> CRV	Vol: \$7,925,807	
7. sbtc [(renBTC, wBTC, sBTC)]	APY:0.17% +3.38% to 8.96% <span>↑</span> CRV	Vol: \$3,494,316	
8. nbtc [(nBTC, wBTC)]	APY:0.06% +1.08% to 30.19% <span>↑</span> CRV	Vol: \$1,533,145	
9. 3pool [DAI, USDC, USDT]	APY:1.83% +21.14% to 52.84% <span>↑</span> CRV	Vol: \$49,340,768	
10. gusd [GUSD, 3pool]	APY:2.12% +45.37% to 113.43% <span>↑</span> CRV	Vol: \$5,154,604	
11. husd [HUSD, 3pool]	APY:2.44% +19.59% to 48.97% <span>↑</span> CRV	Vol: \$273,667	
12. usdk [USDK, 3pool]	APY:1.25% +45.77% to 114.42% <span>↑</span> CRV	Vol: \$0	
13. usdn [USDN, 3pool]	APY:1.78% +53.07% to 132.68% <span>↑</span> CRV	Vol: \$1,478,512	
14. linkusd [LINKUSD, 3pool]	APY:0.84%	Vol: \$0	
15. musd [mUSD, 3pool]	APY:1.15% +36.73% MTA +1.87% to 4.68% <span>↑</span> CRV	Vol: \$168,195	
16. rsv [rsv, 3pool]	APY:1.33% +8.34% RSV +40.07% to 100.17% <span>↑</span> CRV	Vol: \$14,478	
17. tbtc [tbtc, sbtcCrV]	APY:0.14% +5.02% to 12.55% <span>↑</span> CRV	Vol: \$6,771	
18. dUSD [dUSD, 3pool]	APY:1.13% +23.33% DFD +15.38% to 38.42% <span>↑</span> CRV	Vol: \$321,602	
19. gbtc [gbtc, sbtcCrV]	APY:0.19% +13.93% PNT +2.51% to 6.27% <span>↑</span> CRV	Vol: \$43,140	
20. bbtc [bbtc, sbtcCrV]	APY:0.39% +25.85% to 64.58% <span>↑</span> CRV	Vol: \$225,149	
21. obtc [obtc, sbtcCrV]	APY:0.41% +19.97% BOR +4.50% to 11.26% <span>↑</span> CRV	Vol: \$70,520	
22. ust [ust, 3pool]	APY:6.02% +46.17% to 115.41% <span>↑</span> CRV	Vol: \$1,302,906	
23. eurs [eurs, eur]	APY:0.56% +14.59% SNX +59.94% to 140.84% <span>↑</span> CRV	Vol: \$637,182	
24. seeth [eth, seeth]	APY:0.53% +30.15% to 75.38% <span>↑</span> CRV	Vol: \$611,799	
25. aave [(aDAI, aUSDC, aUSDT)]	APY:13.85% +20.33% to 50.81% <span>↑</span> CRV	Vol: \$3,713,605	
26. steth [eth, steth]	APY:0.85% +34.11% LDO +7.29% to 18.23% <span>↑</span> CRV	Vol: \$1,674,565	



# Curve.fiのPoolについて

- 債権トークンを流動性供給することができる。(Compound, Aaveのから、iearnのyストラテジーまで)  
Swapするときに引き出し処理を一緒にすればOKなため

0. Compound	[(c)DAI, (c)USDC]	APY:10.05% +18.93% to 47.33%  CRV	Vol: \$4,343,139
1. USDT	[(c)DAI, (c)USDC, USDT]	APY:5.63% +7.53% to 18.83%  CRV	Vol: \$174,943
2. PAX	[(y)cDAI, (y)cUSDC, (y)cUSDT, PAX]	APY:0.97% +21.47% to 53.68%  CRV	Vol: \$142,338
3. Y	[(y)DAI, (y)USDC, (y)USDT, (y)TUSD]	APY:7.59% +22.55% to 56.38%  CRV	Vol: \$13,345,759



# Curve.fiのPoolについて

Compound Pool

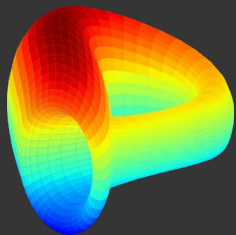
487,334gas

compoundのsupply

withdraw

collect comp

Transaction Hash:	0xc27a0c2f4146c7517e86a0af0f5e215ee818cd3cd0c154a7343852876b2fb995
Status:	Success
Block:	11676592 1228 Block Confirmations
Timestamp:	4 hrs 26 mins ago (Jan-18-2021 02:43:57 AM +UTC)   Confirmed within 15 secs
From:	0x74a9eb7ffb2cbde831425379ebf5a6836ddd73a
Interacted With (To):	Contract 0xa2b47e3d5c44877cca798226b7b8118f9bf7a56 (Curve.fi: Compound Swap) ✓
Transaction Action:	<ul style="list-style-type: none"><li>Collected 0.005808748607267969 COMP For Supplying USDC On Compound</li><li>Supply 62,000 USDC To Compound</li><li>Collected 0.00896963591535615 COMP For Supplying DAI On Compound</li><li>Withdraw 61,961.628091631681957793 DAI From Compound</li></ul>
Tokens Transferred:	<ul style="list-style-type: none"><li>From 0x74a9eb7ffb2cbd... To Curve.fi: Compound... For 62,000 (\$62,000.00) USD Coin (USDC)</li><li>From Curve.fi: Compound... To Compound USD Coin For 62,000 (\$62,000.00) USD Coin (USDC)</li><li>From Compound USD Coin To Curve.fi: Compound... For 2,889,064.90942163 (\$62,032.56) Compound USD... (cUSDC)</li><li>From Compound Dai To Curve.fi: Compound... For 61,961.628091631681957793 (\$61,961.63) Dai Stableco... (DAI)</li><li>From Curve.fi: Compound... To Compound Dai For 2,956,662.44380142 (\$62,002.25) Compound Dai (cDAI)</li><li>From Curve.fi: Compound... To 0x74a9eb7ffb2cbd... For 61,961.628091631681957793 (\$61,961.63) Dai Stableco... (DAI)</li></ul>
Value:	0 Ether (\$0.00)
Transaction Fee:	0.0243667 Ether (\$29.56)
Gas Price:	0.00000005 Ether (50 Gwei)
Gas Limit:	1,200,000
Gas Used by Transaction:	487,334 (40.61%)



# Curve.fiのPoolについて

yPool

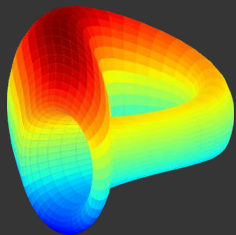
784178gas

learnのsupply

withdraw

② Transaction Hash:	0xaa57f0bba8fddd80a6b3d6912e79a5dde5121dc8910f63e01e619c0e28d2c71d <a href="#">🔗</a>
② Status:	<span>✔ Success</span>
② Block:	11677258 <span>582 Block Confirmations</span>
② Timestamp:	⌚ 2 hrs 2 mins ago (Jan-18-2021 05:11:41 AM +UTC)   ⌚ Confirmed within 1 sec
② From:	0x864b81c40d8314d5c4289a14eb92f03b9f43b6bc <a href="#">🔗</a>
② Interacted With (To):	Contract 0x45f783cce6b7ff23b2ab2d70e416cdb7d6055f51 (Curve.fi: y Swap) <span>✔</span> <a href="#">🔗</a>
🔗 Transaction Action:	➤ Swap 50,000  TrueUSD For 50,004.899719  Tether USD On  Curve.fi
② Tokens Transferred: 6	<div>➤ From 0x864b81c40d8314... To Curve.fi: y Swap For 50,000 (\$50,000.00)  TrueUSD (TUSD)</div> <div>➤ From Curve.fi: y Swap To yearn: yTUSD Token For 50,000 (\$50,000.00)  TrueUSD (TUSD)</div> <div>➤ From 0x0000000000000000... To Curve.fi: y Swap For 48,612.437129032014578327  learn TUSD (yTUSD)</div> <div>➤ From Curve.fi: y Swap To 0x0000000000000000... For 47,815.634199  learn USD (yUSD)</div> <div>➤ From yearn: yUSD Token To Curve.fi: y Swap For 50,004.899719 (\$50,504.95)  Tether USD (USD)</div> <div>➤ From Curve.fi: y Swap To 0x864b81c40d8314... For 50,004.899719 (\$50,504.95)  Tether USD (USD)</div>
② Value:	0 Ether (\$0.00)
② Transaction Fee:	0.0322297158 Ether (\$39.14)
② Gas Price:	0.0000000411 Ether (41.1 Gwei)
② Gas Limit:	1,600,000
② Gas Used by Transaction:	784,178 (49.01%)





# Curve.fiのPoolについて

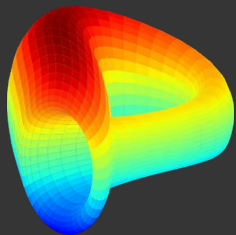
3pool

114332gas

ただ交換

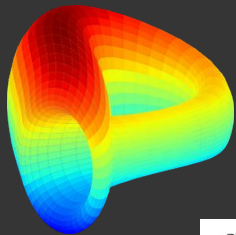
するだけ

⑦ Transaction Hash:	0xaebbf25b9d09e76c3a51ab2a1df8e43cdecc731a64c3a053a4126d48e0c88dd2
⑦ Status:	<span>✔ Success</span>
⑦ Block:	11677576 <span>282 Block Confirmations</span>
⑦ Timestamp:	⌚ 58 mins ago (Jan-18-2021 06:19:17 AM +UTC)   ⌚ Confirmed within 30 secs
⑦ From:	0x5dd596c901987a2b28c38a9c1dfbf86ffc15d77
⑦ Interacted With (To):	Contract 0xbebc44782c7db0a1a60cb6fe97d0b483032ff1c7 (Curve.fi: DAI/USDC/USDT Pool) <span>✔</span>
⑦ Tokens Transferred: ②	<div>▶ From 0x5dd596c901987a... To Curve.fi: DAI/USDC/... For 400,000 (\$400,000.00)  Dai Stableco... (DAI)</div> <div>▶ From Curve.fi: DAI/USDC/... To 0x5dd596c901987a... For 399,975.371514 (\$403,975.13)  USD Coin (USDC)</div>
⑦ Value:	0 Ether (\$0.00)
⑦ Transaction Fee:	0.00516666308 Ether (\$6.28)
⑦ Gas Price:	0.00000004519 Ether (45.19 Gwei)
⑦ Gas Limit:	300,000
⑦ Gas Used by Transaction:	114,332 (38.11%)

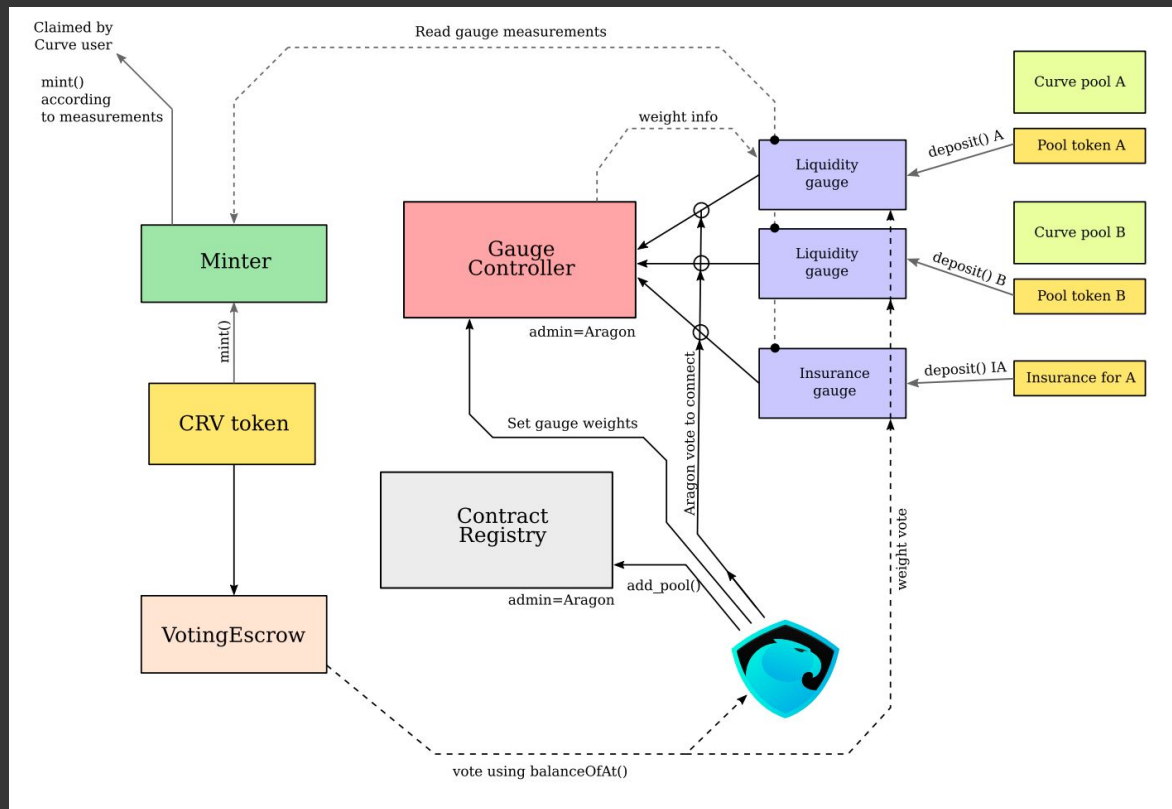


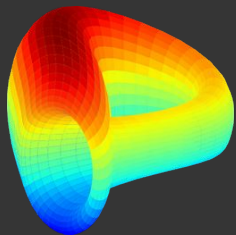
## Curve.fiのPoolについて

- Metapool: 新規Stablecoinとプールトークン(Stablecoinだったら3CRV、Bitcoin系だったらsbtcCRV(sBTC/renBTC/wBTC)をついにしてプールを作成する。最近ある、新しいStablecoinをあげるときはほぼこれになってる。
  - 流動性が散らない
  - 新規ペアを上げやすくなる
- Trading feeは0.04%、半分为LPに、半分为veCRV Rewardにいく



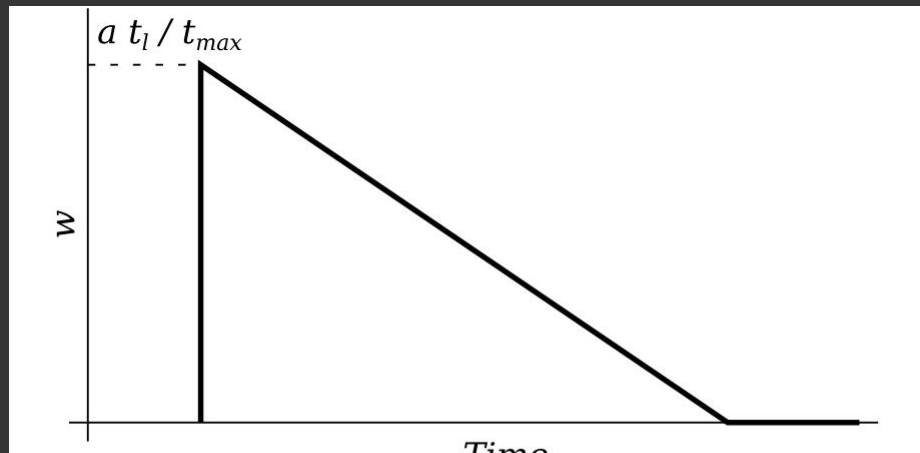
# Curve.fi DAO, CRV, veCRV

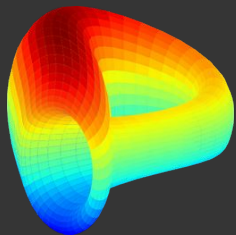




# Curve.fi DAO, CRV, veCRV

- CRVは4年にわたって流動性供給した人に対して配られる
- 各流動性供給プールの報酬額は、一週間にいっぺん更新されるGauge weight voteによって決定される
- 投票及び報酬分配はveCRVによって行われる。veCRVはStateとしてのみ存在する。(Tokenではない)。その量はロック期間×ロック額によって決まる



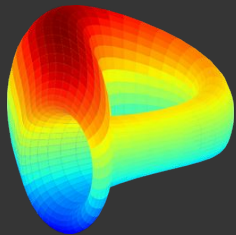


# Curve.fi DAO, CRV, veCRV

- veCRVは他にもReward Boostにも使える(最大でCRVの流動性供給による報酬額を2.5xすることができる)

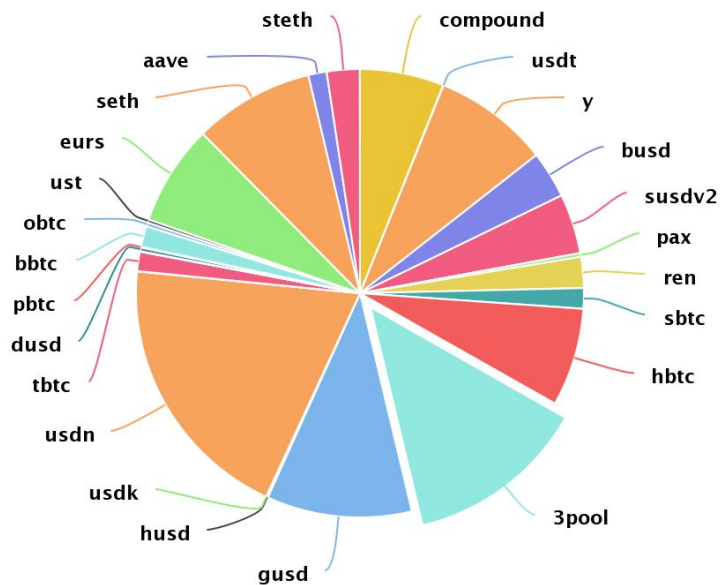
$$\min((DollarProvided * 40 / 100) + (TotalLiquidity * VotingBalance / VotingTotal * (100 - 40) / 100), DollarProvided)$$

- あとは一般的なガバナンスとか
- ちなみに: Feeは今のところ年間で1veCRVあたり0.29ドルだがインフレあるので...



# Curve.fi DAO, CRV, veCRV

Gauge relative weight

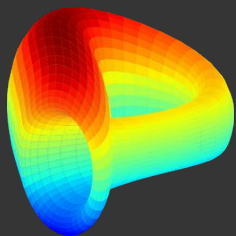


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サードパーティーの開発の一つに、yveCRVがある

- veCRVのToken化 ( yearn strategy vault)
- depositされたCRVはveCRVとなり、他のyearn vault (3CRVなど)のBoostingに使われる
- yveCRVは自分のBoostingには使えない代わりに、他のyearn vaultのBoostingによって得られた追加のリワードの一部を3CRVで受け取ることができる
- yyveCRVも開発中 (3CRV rewardをまたyveCRVに再投資するStrategy)



# Cross-assets Swap

- つい先日リリースされた、Cross asset Swapの機能
- 例えばUSDCからWBTCなら、USDC→sUSD→sBTC→WBTCのように交換される(sUSDからsBTCはSynthetix Exchangeを使う) feeは0.38%
- txは二回に分けて行われる(Synthetix Exchangeの使用上)
- 例) WBTC/USDCのレートは36273USDCの時、1inchは3.37%、Curve x Synthetixは0.625% (ただし合計で2mGasくらいかかる)

You Pay

USD Coin ≈ \$9,999,908.50

USDC ▾ 10000000

↕

You Receive

Wrapped BTC ≈ \$9,663,272.50 (-3.37%)

WBTC ▾ 267.128

Swap using all Curve pools

Swap ren pool    Swap sbtc pool

Max: 0.00

USDC ▾ 10000000 ↔ WBTC ▾ 273.97750697

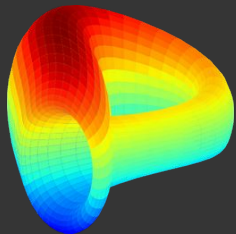
Exchange rate WBTC/USDC ⌘ (including fees): 36499.34664562

Trade routed through: Curve x Synthetix [?]

[X] Infinite approval - trust Curve x Synthetix contract forever

Advanced options ▲





# Pool Factory

- Metapoolを誰でも作れるようにしたもの(yearn 開発) <https://crv.finance/>
- 今のところAlgorithmic stablecoin系がある

This project is in beta. Use at your own risk.

pool

BAC3CRV-f

from Balance: 0.0000 BAC

0.00 BAC

to Balance: 0.0000 DAI

0.00 DAI

enter from amount