LAMM ("Libra Advanced Margin Model") for Crypto Collateralized Futures

February 4, 2019

Libra Advanced Margin Model (LAMM)

Value at Risk system using stochastic modeling and Monte Carlo simulation. The objective is to protect the exchange by controling the risk of insolvency while minimizing the collateral constraints. This requires:

1. Risk assessment for extreme adversarial scenarios
2. Simulation based assessment of losses in these cases
3. Risk credits for offsetting exposures

EMX Margin Mechanics

- ▶ Three levels of margin
  - ▶ **initial margin (IM)**
    - ▶ triggers margin warning
    - ▶ based on hitting time in stochastic process
  - ▶ **maintenance margin (MM)**
    - ▶ triggers margin call / partial liquidation
    - ▶ based on hitting time and market impact
  - ▶ **liquidation margin (LM)**
    - ▶ triggers forceful portfolio liquidation
    - ▶ based on market impact

EMX Margin Mechanics

- Margin level based on risk exposure
  - Risk exposure assessed by asset class
    - risk exposure across maturities will be assessed based on spot-future parity
    - opposing positions will be credited no more than 80% of overall risk to account for liquidity discrepancies between maturities
  - Risk exposure due to margin deposit will be assed with spot prices
  - Additional margin credits will be given to opposing positions of some pairs of highly correlated assets (typically pairs of crypto assets) based on year long correlation data

Risk and Margin
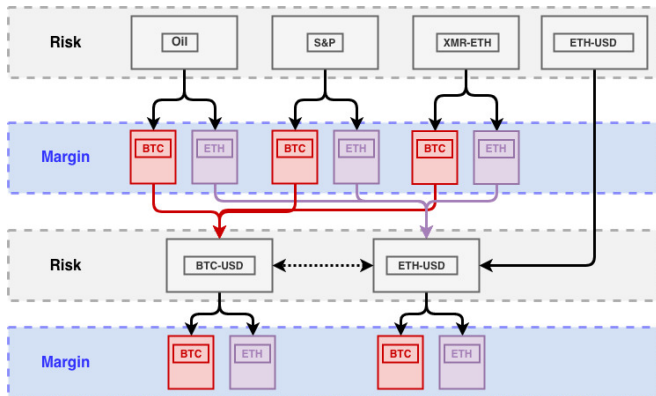
Deliverable: Setting Margins

Table: Non Collateral Assets - conf 95%

underlying	direction	horizon	base risk	step size	liquidation	maintenance	initial
Oil Crude WTI	short	8	100 BTC	100 BTC	1%	2.458%	3.687%
Oil Crude WTI	long	8	100 BTC	100 BTC	1%	2.458%	3.687%
Oil Crude WTI	short	24	100 BTC	100 BTC	1%	4.296%	6.4434%
Oil Crude WTI	long	24	100 BTC	100 BTC	1%	4.296%	6.443%
ETH-BTC	short	8	50 BTC	50 BTC			
ETH-BTC	long	8	50 BTC	50 BTC			
ETH-BTC	short	24	50 BTC	50 BTC			
ETH-BTC	long	24	50 BTC	50 BTC			
XRP-USD	short	8	50 BTC	50 BTC			
XRP-USD	long	8	50 BTC	50 BTC			
XRP-USD	short	24	50 BTC	50 BTC			
XRP-USD	long	24	50 BTC	50 BTC			

Table: Collateral Assets - conf 95%

underlying	direction	horizon	base risk	step size	liquidation	maintenance	initial
BTC-USD	short	8	100 BTC	50 BTC	2%	4.932%	7.398%
BTC-USD	long	8	50 BTC	50 BTC	2%	5.188%	7.782%
BTC-USD	short	24	50 BTC	50 BTC	2%	8.388%	12.582%
BTC-USD	long	24	50 BTC	50 BTC	2%	9.156%	13.734%
ETH-USD	short	8	100 BTC	100 BTC	3%	7.311%	10.967%
ETH-USD	long	8	50 BTC	50 BTC	3%	7.888%	11.833%
ETH-USD	short	24	100 BTC	100 BTC	3%	12.323%	18.484%
ETH-USD	long	24	50 BTC	50 BTC	3%	14.055%	21.083%

Deliverable: Cross Maturity Margin Credits

contract	maturity	horizon	liquidation	maintenance	initial
Oil Crude WTI	1m	8	60%	80%	80%
Oil Crude WTI	2m	8	50%	75%	75%
Oil Crude WTI	3m	8	40%	65%	65%
Oil Crude WTI	1m	24	55%	80%	80%
Oil Crude WTI	2m	24	45%	70%	70%
Oil Crude WTI	3m	24	30%	55%	55%
ETH-BTC	1m	8	60%	80%	80%
ETH-BTC	2m	8	50%	75%	75%
ETH-BTC	3m	8	40%	65%	65%
ETH-BTC	1m	24	55%	80%	80%
ETH-BTC	2m	24	45%	70%	70%
ETH-BTC	3m	24	30%	55%	55%
XRP-USD	1m	8	60%	80%	80%
XRP-USD	2m	8	50%	75%	75%
XRP-USD	3m	8	40%	65%	65%
XRP-USD	1m	24	55%	80%	80%
XRP-USD	2m	24	45%	70%	70%
XRP-USD	3m	24	30%	55%	55%

Deliverable: Cross Asset Margin Credits

asset 1	asset 2	horizon	liquidation	maintenance	initial
ETH	BTC	8	0%	20%	20%
ETH	BTC	24	0%	15%	15%
XRP	BTC	8	0%	15%	15%
XRP	BTC	24	0%	10%	10%
XRP	ETH	8	0%	12%	12%
XRP	ETH	24	0%	8%	8%