Mathematical Formula for Mixed Covariance Multiplicative Matrix (scaling to 100's to 1000's of assets):

LaTeX Mathematical Markup Lang.:

$$Q = \left\| \frac{s_{t1}\{.\text{PCA1}\}, s_{t1}\{.\text{PCA2}\}}{\sqrt{\{\text{StdDev}\}(s_{t1}\{.\text{PCA1,PCA2}\})}} \right\| * \left\| \frac{\{\text{STRAT1.PCA1}\}, \{\text{STRAT1.PCA2}\}}{\sqrt{\{\text{StdDev}\}(\{\text{STRAT1.PCA1,PCA2}\})}} \right\| * \left\| \frac{\{\text{PORT1.PCA1}\}, \{\text{PORT1.PCA2}\}}{\sqrt{\{\text{StdDev}\}(\{\text{PORT1.PCA1,PCA2}\})}} \right\|$$

Where:

Q is Quantum State

$s_{t1}.PCA1, s_{t1}.PCA2$ is Asset1 PCA 1, 2 Returns. represented in qubits quantum state, using Asset 1's PCA 1, 2 values/levels.

$STDDEV(s_{t1}.PCA1, PCA2)$ is the square root of Asset1 STD DEV PCA 1, 2 Returns, represented in qubits quantum state, using Asset 1's PCA 1, 2 values/levels.

$STRAT1.PCA1, STRAT1.PCA2$ is Algorithmic Strategy 1's PCA 1, 2 Returns, represented in qubit's quantum state, using STRAT1's PCA 1, 2 values.

$STDDEV(STRAT1.PCA1, PCA2)$ is the square root of Algorithmic Strategy 1's PCA 1, 2 STD DEV, represented in qubit's qubit state, using STD DEV PCA 1, 2 values

$PORT1.PCA1, PORT1.PCA2$ is Portfolio 1's PCA 1, 2 Returns, represented in qubit's qubit state, using Portfolio 1 PCA 1, 2 Returns values

$STDDEV(PORT1.PCA1, PCA2)$ is the sq. rt. of Portfolio 1's PCA 1, 2 STD DEV, represented in qubit state

PCA in unit norm 1.

Code:

```
Q = np.linalg.norm(s_t1_PCA1, s_t1_PCA2 returns / np.sqrt(StdDev_st1_PCA1_PCA2)) * \
   np.linalg.norm(STRAT1_PCA1, STRAT1_PCA2 returns / np.sqrt(StdDev_STRAT1_PCA1_PCA2))
* \
   np.linalg.norm(PORT1_PCA1, PORT1_PCA2 returns / np.sqrt(StdDev_PORT1_PCA1_PCA2))
```

LaTeX code for top formula:

```
Q = \left\lVert \frac{{s_{t1}\text{{.PCA1}},
s_{t1}\text{{.PCA2}}}}{{\sqrt{{\text{{StdDev}}(s_{t1}\text{{.PCA1,PCA2}})}}}} \right\rVert * \left\lVert
\frac{{\text{{STRAT1.PCA1}},
\text{{STRAT1.PCA2}}}}{{\sqrt{{\text{{StdDev}}(\text{{STRAT1.PCA1,PCA2}})}}}} \right\rVert * \left\lVert
\frac{{\text{{PORT1.PCA1}}, \text{{PORT1.PCA2}}}}{{\sqrt{{\text{{StdDev}}(\text{{PORT1.PCA1,PCA2}})}}}}
\right\rVert
```