Currency Exchange Problem –

Given;

F is the matrix that contain the exchange rates in the problem. It's a 10x10 matrix such that F_{ij} means the units of currency it costs to buy one currency of i.

Cinit is the array that contain the initial unit of currency that we have.

Creq is the array that contain we should have after carrying out the exchange.

X is the matrix that contain the exchange that we carry out for each of the currency. X_{ij} represents the amount of j currency we exchange for the currency i.

Multiply Square_Root(F_{j1}/F_{1j}) to get the value of currency in USD.

Objective function

Objective from the problem is to **minimise** the cost of exchange that we carry out in the whole transaction.

The variable that we optimise to meet the objective is the matrix X.

Conclusion Drawn

Cfinal is the array that contain final currency amount that we have post exchange. Cfinal needs to calculated by formulating the equation from the problem. (Matrix Operation on Cinit, X and F etc)

Constraints drawn from the problem

1. Cfinal should be at least equal to Creq.
2. X_{ij} should be positive. (Exchanges cannot be negative)
3. $X_{ii} = 0$ same currency cannot the used for the exchange.

4. The total each currency that we have cannot be greater than Cinit.

Formulate these objectives and constraint's and solve using cvxpy to get the minimum cost.

Then cost is calculated in USD so display the optimized cost post calculation.