

Convex Optimization

Tutorial 2

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- In our problem our main variable is X , which denote the currency exchanges that we carry out, with $X_{ij} \geq 0$ the amount of currency j we exchange on the market for currency i
- For each currency j , we exchange into i , a total of $\sum_i X_{ij}$ is exchanged, the vector representing this would be $X^T \mathbf{1}$
- For the exchange of X_{ij} of currency j , we receive $\frac{X_{ij}}{F_{ij}}$ of currency i . We receive a total amount of currency i which is $\sum_j \frac{X_{ij}}{F_{ij}}$, the vector representing this would be X/F
- The amount of currency after all exchanges would be equal to
 - $pea = c_{init} - X^T \mathbf{1} + X/F$
- The cost function for this entire transaction is
 - $coe = \sum_j (c_{init} - pea) \sqrt{\frac{F_{j1}}{F_{1j}}}$
- The following are the constraints
 - $X \geq 0$
 - $X_{ii} = 0, \forall i$
 - $c_{init} \geq X^T \mathbf{1}$
 - $pea \geq c_{req}$
- We minimize the cost function with X, pea being the optimization variables
- The constraints were given in the problem statement
- The cost function was written based on the “currency holdings value” in USD
- Our main variable was X , and we had to find its optimal value so that it can minimize our cost of exchanges in USD