Lexx Pino & Rohan Reddy **November 24, 2020**
Math 260

Project Discussion

Description

Our project idea was to test the Bellman Ford algorithm as an application finding currency arbitrage opportunities given data sets in the form of currency exchange rates. The files data1.csv through data5.csv contain lists of exchange rates for various currencies, each containing different pathways to currency arbitrage. The files are read in through a csv reader in the Arbitrage class that converts the csv into a pair of lists, which becomes inputs for the Bellman Ford algorithm below it.

In the bellman.py file is the code for the arbitrage class along with the algorithm itself. The algorithm reads in a list of currencies along with pairs of exchange rates (all possible currency pairing given the list) which comes from the csv file. Then it initializes a graph with edges between each possible pair of vertices. An important step here is taking the negative log of conversion rates which becomes the edges of the graph, since this is how the algorithm detects negative weight cycles. Given a starting vertex, it calculates the shortest distance to each of the other vertices. It returns all the negative weight cycles, which are the actual pathways for exploiting arbitrage opportunities in the forex market. These negative cycles are then displayed along with profit margins for each one.

Discussion

What intrigued us the most during this project was understanding why arbitrage is not generally accessible to retail investors like ourselves. The reality behind currency arbitrage is that the opportunities are exploited nearly instantaneously by trading algorithms and market corrections, or they are just not profitable because of transaction fees outweighing the profit margins. In general, the data sets we wrote up provide numerous paths to arbitrage but all have nearly negligible profit margins.