MAS 632 Fall 2023 - Final Project

Prof. Christos Zacharias

Chose one of the following four options for final project. Write one introductory paragraph about the problem you are addressing (motivation, importance, etc.), one paragraph describing the problem data, and one concluding paragraph discussing your findings (optimal strategy, managerial implications, etc.). Present clearly the mathematical program, Python Colab notebook, and/or Excel spreadsheet.

Option 1: Pick your 20 favorite stocks. Use Python to

(a) Collect data about their returns (based on closing price) for the last 3 months; you can find such data on the internet, for example at `https://finance.yahoo.com/lookup`.

(b) Compute the average return and the covariance matrix.

(c) Plot the efficient frontier of your optimal portfolio of minimum variance.

(d) Set your target return to be equal to the average return across all stocks. What is your optimal portfolio?

(e) Do something original beyond what we covered in class.

Option 2: Revisit the multi-period cash flow problem. Create a Python Colab notebook that solves this problem. Use different data from bonds currently available to purchase.

Option 3: General multi-period cash flow problem. Come up with a business plan for the next 12 months. Identify your main sources of current and future monthly operational expenses (e.g., inventory, research and development, payroll etc.) and your main sources of current and future monthly income (e.g., sales revenue, outside investments, etc.). Your objective is to figure out the minimum amount of initial investment which can sustain your business plan. You can use either Python or Excel to solve this problem.

Option 4: Any original optimization problem. You can either use real data or simulated data.

Timeline:

- You will present a draft version of your project during Lecture 12, Sep 28, 5 mins each presentation, via zoom.
- A complete project is due on Final Exam day, by midnight.