68- #1168 SPARSE PORTFOLIOS FOR HIGH- DIMENSIONAL FINANCIAL INDEX TRACKING WITH LOW-RANK MATRIX CONSTRAINT FOR STOCKS

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Abstract:

Selection of the securities for investment portfolio design is one of the most important optimization problems of the last century. For this, numerous strategies and mathematical models have been proposed. For instance, the passive investment strategy performs the tracking of market indices with the intention of reproducing its performance with an optimized portfolio as described in [1].

This passive strategy is based on the advances shown by Palomar [2] who deals with the issue of designing sparse portfolios to efficiently reproduce the returns of any index. Once the stocks have been selected, the following step aims at dividing the investment capital between these stocks in some efficient way. This strategy has shown promising performance, however, it does not take into account the correlation between the selected stock returns, which is an important factor in the efficient selection of the stocks, but a cointegration based approach.

Therefore, the main objective of this work relies on formulating a mathematical model that allows to find high correlated stocks for the sparse portfolio design. Thus, it aims at modifying previous work to improve the quality results by taking into account the correlation between the stocks.

In this manner, the proposed optimization problem includes the nuclear norm over the market returns matrix multiplied by the desired variable weights, such that it is possible to apply some thresholding technique over the singular value decomposition of this resulting matrix as presented in [3]. This allows to reduce its rank iteratively with the objective of obtaining its low-rank approximation, which multiplied by the inverse returns matrix, results in the desired portfolio weights.

References:

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