

Quantum-Inspired Portfolio Optimization In The QUBO Framework

國立台灣大學物理系 呂英樟

Abstract

A quantum-inspired optimization approach is proposed for portfolio optimization with fractional investment, aiming to select an optimal mix of assets based on the risk-return trade-off to achieve investment goals. By integrating conventional methods with quantum-inspired techniques for penalty coefficient estimation, this approach enables faster and more accurate solutions to portfolio optimization which is validated through experiments using a real-world dataset of quarterly financial data spanning over ten years. Additionally, the proposed preprocessing method of two-stage search further enhances the effectiveness of our approach, showing the ability to reduce computational time by nearly half of the original time while enhancing the solution accuracy by nearly 50%, through appropriate parameter settings. This research contributes two methods, penalty coefficient estimation and two-stage search, to the growing body of literature on quantum-inspired techniques in finance, demonstrating its potential as a valuable tool for asset allocation and portfolio management.