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Translation-invariant and positive homogeneous risk measures and optimal portfolio management

Abstract: The problem of risk portfolio optimization with translation-invariant and positive-homogeneous risk measures, important representatives of which are value-at-risk (VaR) and tail conditional expectation (TCE), leads for the case of elliptical multivariate underlying distributions to the problem of minimizing a combination of a linear functional and the square root of a quadratic functional. In this paper we provide a simple and feasible condition under which the optimal solution exists, and the explicit closed-form solution of this minimization problem is provided prior to this condition. The results are illustrated using data of 10 stocks from NASDAQ/Computers. The closeness between the VaR and TCE optimal portfolios is investigated.