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Lasso optimal portfolio: Construction and properties

Danie Viitanen Hellström*

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Abstract

This thesis investigates the construction of an optimal portfolio using Lasso, Ridge and Elastic net regularization methods. Contrary to expectations, portfolios constructed with Ridge regression underperforms across all evaluation metrics when compared to the market, despite their complexity involving the whole sample of assets while also including negative asset weights. In contrast, portfolios constructed using Lasso and Elastic net regularization show a different pattern. These portfolios are characterized by their sparsity, sometimes containing only a single asset. Notably, there exists a clear inverse relationship between the number of assets and the evaluation metrics, with larger portfolios yielding inferior results. While the allure of these sparse portfolios is evident, they also come with a significantly higher risk, both in the terms of volatility, measured by standard deviation, and the lack of diversification. These findings shed light on the nuanced trade-offs inherent in portfolio construction and underscore the importance of risk management in investment strategies.

*Postal address: Mathematical Statistics, Stockholm University, SE-106 91, Sweden.
E-mail: danie.hellstrom@gmail.com. Supervisor: Taras Bodnas Jan Olov Persson.