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Information Theory-Based Approach to Portfolio Optimization

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Message from the Guest Editor

Portfolio optimization has been the main quantitative approach for constructing portfolios that exploit diversification among various financial assets and managing risk of investments. There has been extensive research on incorporating various risk measures, adding practical constraints, enhancing portfolio robustness, and solving multi-stage investment problems. These quantitative models have become more important due to the rise in data-driven methods and automated services. The expansion of data analysis and machine learning in particular is presenting advanced approaches to portfolio construction. For example, alternative data allow portfolios to consider non-traditional information that improves asset modeling and factor-based allocations. Further, machine learning models such as neural networks are being used to build portfolio models that better capture inherent characteristics of assets for forming efficient portfolios from a large dataset. Data-based approaches have also led to further use of information theory, entropy, and network theory for measuring asset risk, analyzing market dynamics, and understanding complex financial systems for making allocation decisions.

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Message from the Editor-in-Chief

The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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