SOE 19: Financial Markets and Risk Management II

Time: Wednesday 16:45–17:30   Location: H36

SOE 19.1   Wed 16:45   H36

Optimal energy-mix and portfoliomanagement on the basis of German electricity data — •Magda Schiegl — University of Applied Sciences Landshut

The 2013 German electricity data, namely the load and the production of fluctuating renewable sources of energy (RE), are analysed. The data of the renewable sources consist of on- and off-shore wind and photo-voltaic energy production. We analyse the statistical properties, including the tail behaviour of the distribution functions. It is well known that a remarkable amount of back-up energy is needed to bridge the RE-induced low-power periods * see for instance (1). The magnitude of the back-up capacity is dependent on the RE-energy-mix. We derive a statistical model that allows the analytical calculation of the optimal energy-mix for a minimum back-up energy. Our model is closely related to the Markowitz-model used in portfoliomanagement. We explain why this model delivers very good approximations for the RE-energy-mix problem. Within this framework we analyse the impact of energy storage on the optimal energy-mix and the back-up energy. We further discuss the dependence on different storage properties as for instance magnitude and efficiency.

(1) F. Wagner, Electricity by intermittent sources: An analysis based on the German situation 2012, Eur. Phys. J. Plus (2014), 129: 20

SOE 19.2   Wed 17:00   H36

Comparing systemic risk measures to portfolio optimization models — •Jan Jurczyk and Alexander Eckrot — Universtätsstraße 31, 93053 Regensburg

In this talk we compare systemic risk measures based on the covariance matrix and its eigenvectors to to the ground-state energies of three portfolio distribution models. Namely the mean variance model with constraints, the value at risk model with constraints and the index tracking model. We present the algorithms used in order to generate the optimal portfolios for each model and show a connection between changes in ground-state energies and the systemic risk measure.

SOE 19.3   Wed 17:15   H36

Detrended fluctuation analysis as a regression framework: Estimating dependence at different scales — •Ladislav Kristoufek — Institute of Information Theory and Automation, Czech Academy of Sciences, Czech Republic — Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague, Czech Republic

We propose a framework combining detrended fluctuation analysis with standard regression methodology. The method is built on detrended variances and covariances and it is designed to estimate regression parameters at different scales and under potential non-stationarity and power-law correlations. The former feature allows for distinguishing between effects for a pair of variables from different temporal perspectives. The latter ones make the method a significant improvement over the standard least squares estimation. Theoretical claims are supported by Monte Carlo simulations. The method is then applied on selected examples from physics, finance, environmental science and epidemiology. For most of the studied cases, the relationship between variables of interest varies strongly across scales.