House of Energy Markets & Finance

UNIVERSITÄT DUISBURG ESSEN

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Master thesis

Topic:

Probabilistic modelling of wind infeed: Development of a distributional approach

Background and content of the thesis:

The infeed of intermittent renewable energy sources (RES) increases in the European energy system and subsequently its relevance for several market participants. Predictions of RES infeed are used, among others, in energy trading and power plant dispatch. Particularly rare events of low RES infeed are significant in analyses on security of supply, due to the high share of RES infeed in the total power generation. Security of supply and generation adequacy specifically is assessed in probabilistic approaches with simulation models, that generate many realizations of energy system uncertainties such as RES infeed. In a simulation model, distributional models, such as generalized additive models for location and shape (GAMLSS), are a promising approach to estimate non-parametric distributions of RES-infeed.

This master thesis aims to develop, implement, and evaluate a distributional model to estimate the distribution of onshore wind infeed in Germany, incorporating relevant exogenous factors. The focus of this work will be on parameterizing the distributional model, involving extensive data preparation and exploration. Subsequently, a case study will be conducted, simulating the onshore wind infeed using a simulation model based on the estimated distribution.

For more on GAMLSS see: Stasinopoulos, M. D., Rigby, R. A., Heller, G. Z., Voudouris, V., & De Bastiani, F. (2017). *Flexible regression and smoothing: using GAMLSS in R*. CRC Press.

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Requirements:

Interest in econometrics and data science, preferably previous knowledge in programming with R

Contact person:

Further information are available on request by Maike Spilger.

Tel.: +49 201-183-6713, maike.spilger@uni-due.de

If your interested, please send your application documents (curriculum vitae, transcript of records, letter of motivation) to the email address mentioned above.