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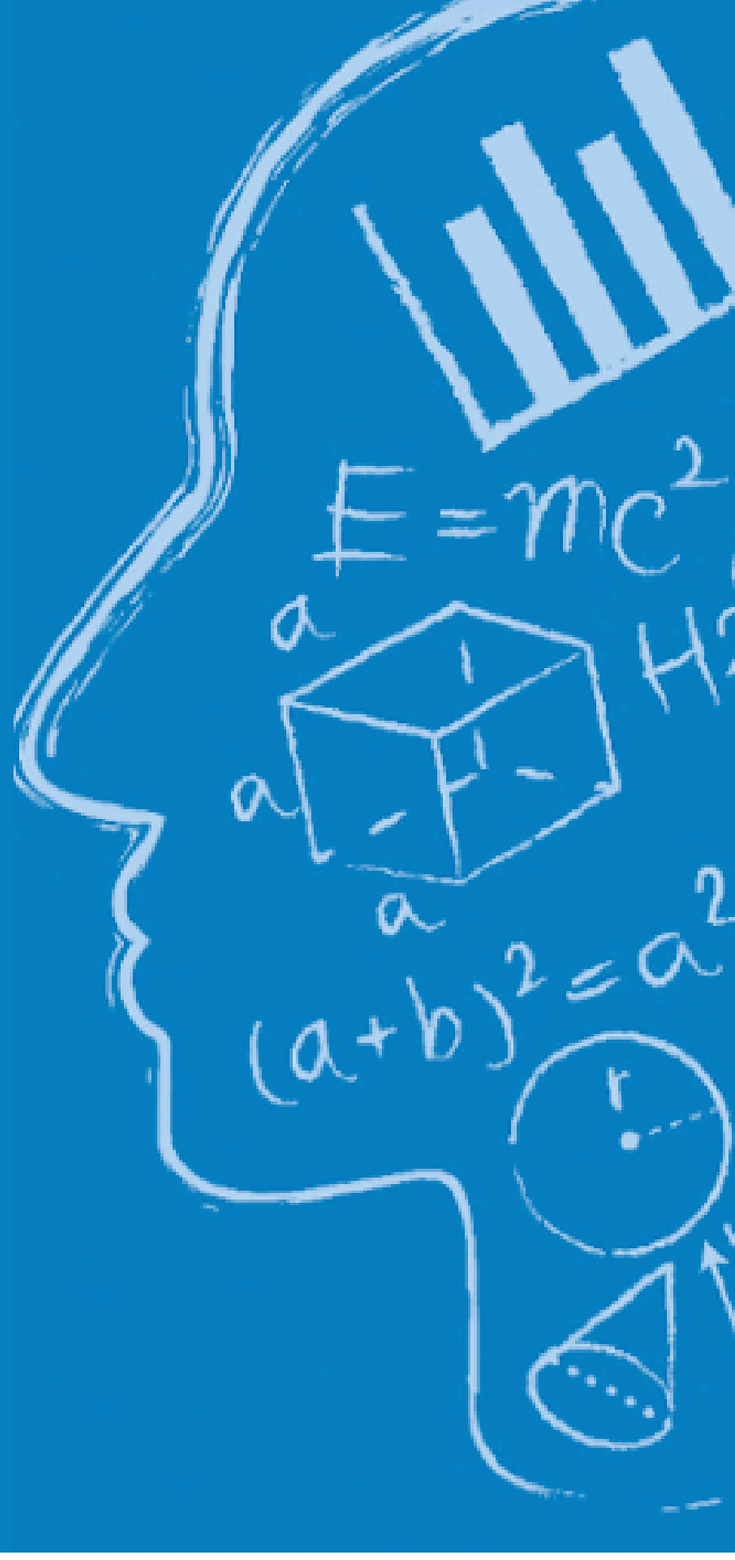

FROM DATA TRANSFORMATIONS AND AGGREGATIONS TO TRANSFER FUNCTIONS: THE IMPORTANCE OF EXTREMES AND BOUNDARY DATA MODELS

ABSTRACT:

Biological, physical, and ecological systems offer a lot of complexity that should be well understood before valuable interventions can be made. We will address both complex and extreme measurements from these systems. There is a necessity to classify appropriate learning mechanisms and define transfer functions and statistics. A natural question may arise: how to address extreme parts of data? How to define boundaries of the datasets and what can be the effects on statistical properties of estimated structures (e.g. uniqueness of copulas? Can we provide efficient estimators of extremes? For closed physical systems, all can be well integrated into both natural and technical sciences, which gives us an optimal instrument for the decomposition of data into stochastic, deterministic, and chaotic part. In particular, we will introduce SPOCU transfer function and provide some of its unique properties for processing of complex data, statistical learning will be discussed, and tuning of parameters of SPOCU-based neural networks will be explained. During the talk, I will acknowledge the contributions of the Portuguese Extreme group and outline some relations to t-Hill-based estimators. The t-Hill approach will be introduced from a robustness perspective, mentioning and interconnecting with articles, among others. Attractive applications to biological systems, such as mass balance in the ecosystem of glaciers in Patagonia, or methane emissions from wetlands will be addressed.

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14:30

ZOOM

Centro de Estatística e Aplicações
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Milan Stehlík obtained his Master's degree in Mathematics and PhD in Statistics from Comenius University in Bratislava, Slovakia. Since 2015, he has been a Full Professor at the University of Valparaiso in Chile. From 2018 to 2020, he was a Visiting Professor at the University of Iowa and Arizona State University.
He cooperates with numerous universities around the world, including Stanford University and University of California Los Angeles (UCLA). He serves as an Associate Editor for several research journals, including Journal of Applied Statistics and Chilean Journal of Statistics, and is the Founding Editor-in-Chief of Research in Statistics published by Taylor and Francis. He has authored more than 230 papers and has given over 250 talks.
Prof. Stehlik's research focuses on data science, neural computing, statistics, and mathematical modeling. He conducts methodological research in Extremes, Optimal Design of Experiments, Statistical Modeling, and Neural Computing with applications in medicine, environmental sciences, ecology, and economics.

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