Physics Colloquium Mainz

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Lecture room KPH,
Johann-Joachim-Becher-Weg 45, JGU

Causality as a Principle for Statistical Inference and Applications to Climate

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Statistical inference aims to fit observed data into a model that explains the data and is able to make predictions. However, as we are repeatedly told, 'correlation does not imply causation', therefore robust prediction and reasoning about underlying processes governing the data distribution cannot be done by relying on observed statistical dependences alone. Causal reasoning aims to formalise the setting under which causal, rather than merely statistical, relationships can be inferred from observed data, thereby making the learned model more indicative of the true underlying process. In the last decade, the field of causal inference has gained immense popularity in the statistics and machine learning communities to develop and utilise this framework on the one hand, and in application domains such as economics, genetics and climate to use causal algorithms to practical problems of interest on the other hand. In this talk, I will lay the foundations of causal inference, explain the various approaches to do causal inference that have emerged in the recent years, and close the talk with examples of application of the causality framework to climate science.

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