Seminar
Bielefeld - Melbourne Random Matrices

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Random Matrix Model for Non-Stationarity in Complex Systems

Complex systems are often non-stationary, typical indicators are continuously changing statistical properties of time series. In particular, the correlations between different time series fluctuate. Models that describe the multivariate amplitude distributions of such systems are of considerable interest. We view a set of measured, non-stationary correlation matrices as an ensemble for which we set up a random matrix model. We use this ensemble to average the stationary multivariate amplitude distributions measured on short time scales and thus obtain for large time scales multivariate amplitude distributions which feature heavy tails. We explicitly work out four cases, combining Gaussian and algebraic distributions. For the latter we use a determinantal generalization of the Wishart distribution, known as matrix variate t distribution. We also calculate its first and second matrix moments.

In summary, we provide, first, explicit multivariate distributions for non-stationary complex systems and, second, a tool that quantitatively captures the degree of non-stationarity in the correlations. We present some first applications to financial data.

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Zoom Konferenzschaltung – Please contact Anas Rahmann
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