ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

# Invitation to a Guest Lecture

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## "Bayesian Markov-Switching Partial Reduced-Rank Regression"

N.2.35 Wednesday, 10 December 2025 10:00 a.m.

**Abstract**

Reduced-rank (RR) regression is a powerful dimensionality reduction technique, but traditional RR models typically overlook potential group structure in the responses by assuming a low-rank structure for the coefficient matrix. When the observations in the regression model are indexed by time, the relationship between covariates and responses could change over periods. A time-varying grouping structure in the response variables in RR regression is currently understudied. To address this limitation, a Markov-switching Bayesian Partial RR (MSPRR) regression is proposed. First, the response vector is partitioned into two groups to reflect different degrees of complexity of the relationship. A "simple" group assumes a low-rank linear regression, and a "flexible" group remains agnostic and exploits nonparametric regression via a Gaussian Process. Second, unlike traditional approaches that assume known group structure and rank, these are treated as unknown parameters to be estimated. Third, time variation and persistence are accounted for by introducing a Markov-switching process that examines changes in the grouping structure and model parameters over time. We perform fully Bayesian inference using a partially collapsed Gibbs sampler, enabling uncertainty

quantification. Applications to both synthetic and U.S. macroeconomic data demonstrate the proposed method's ability to uncover latent states and hidden structures within the data.

Gregor Kastner and the Department of Statistics look forward to seeing you at the talk!