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PhD Seminar Series

"Seminari di Statistica del Dottorato"

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Viale Morgagni 59, Room 205

Copula Tensor Count Autoregressions

This paper presents a novel copula-based autoregressive framework for multi-layer arrays of integer-valued time series with tensor structure. Our framework generalizes recent advances in tensor time series models for real-valued data to a context that accounts for the unique properties of integer-valued data, such as discreteness and non-negativity. The model incorporates feedback effects for the counts' temporal dynamics and introduces new identification constraints. An asymptotic theory is developed for a Two-Stage Maximum Likelihood Estimator (2SMLE) for the model's parameters. The estimator balances the challenges of high-dimensionality, interdependence of the different count series, and computational stability. Together, this substantially pushes the frontier for modeling high-dimensional, structured tensor time series of counts. An application to tensor crime counts demonstrates the practical usefulness of the proposed methodology.