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01. 06. 2026

Master thesis: Prior-Data Fitted Networks and Martingale Posteriors (June 2026)

Summary of arXiv:2505.11325: Prior-data fitted networks (PFNs) have emerged as promising foundation models for prediction from tabular datasets, achieving state-of-the-art performance on small to moderate data sizes without tuning. While PFNs are motivated by Bayesian ideas, they do not provide any uncertainty quantification for predictive means, quantiles, or similar quantities. The paper proposes a principled, efficient, and tuning-free sampling procedure to construct Bayesian posteriors for such estimates based on martingale posteriors, and proves its convergence. Several simulated and real-world data examples showcase the efficiency and calibration of the method in inference applications.

The thesis consists of placing martingale posterior distributions in the framework of theoretical statistics and implementing them.