

TIME SERIES ANALYSIS WITH APPLICATIONS IN FINANCIAL MATHEMATICS

FINAL EXAM SYLLABUS (Varga Katalin, 2019)

1. White noise and basic ARMA models, lag operators and polynomials, auto- and cross-correlation, autocovariance function, fundamental representation, state space representation, predicting ARMA models
2. Impulse-response function, Sims and Blanchard-Quah orthogonalization
3. Stationary and ergodic ARMA models, Wold decomposition
4. Vector autoregression (VAR), variance decomposition, VARs in state space notation, Granger causality
5. Spectral representation, spectral density, filtering, spectrum of the filtered series
6. Types of unit root time series, one- and multidimensional Beveridge-Nelson decomposition, random walk components and stochastic trends, unit root tests
7. Cointegration, Vector Error Correcting Representation (VECM), testing cointegration
8. Bayesian Vector Autoregression (BVAR) models, estimation and prediction
9. Important prior-posterior distributions of the BVAR models (Minnesota, normal-Wishart conjugated and independent normal-Wishart priors)
10. Bayesian factor and dynamic factor models, factor augmented VAR (FAVAR) models
11. MCMC methods: Gibbs Sampling, Metropolis and Metropolis-Hastings algorithms, performance evaluation of these methods

LITERATURE

1. J. H. Cochrane: Time Series for Macroeconomics and Finance
2. J. Hamilton: Time Series Analysis
3. G. Koop and D. Korobilis: Bayesian Multivariate Time Series Methods for Empirical Macroeconomics
4. C. Robert: The Bayesian Choice