

FINANCIAL ECONOMETRICS

Alain MONFORT
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PROGRAM

STOCHASTIC PROCESSES: Moments, Stationarity, Autocorrelation and Partial autocorrelation functions, Estimation of autocorrelation and partial autocorrelation functions

ARMA, ARIMA MODELS: Lag operator, Autoregressive processes, Moving average processes, ARMA processes, ARIMA processes

PREDICTION WITH ARIMA MODELS: General principles of prediction, Prediction in ARIMA models, Prediction function and pivotal values, Prediction intervals

INFERENCE IN ARMA MODELS: Estimation, Tests and confidence regions, Validation, Model selection

EXOGENEITY AND CAUSALITY: Definition based on probability distributions, Causality measures, Causality tests, Examples

VAR MODELS AND RESPONSE FUNCTIONS; Multivariate processes, Definition of a VAR, Estimation and tests in a VAR, Causality, Shock propagation, Impulse response function, Variance decomposition, Structural shocks, Examples

STYLISTED FACTS IN FINANCIAL TIME SERIES: Fat tails, Volatility clustering, Asymmetric response to shocks, Correlation of powers, Persistence, Co-volatility

UNIVARIATE ARCH-GARCH MODELS: Motivations, Different kinds of white noises, Definitions of ARCH and GARCH models, Stationarity, Coherence with stylized facts

GENERALIZATIONS OF UNIVARIATE GARCH MODELS: Regression models with GARCH errors, ARMA-GARCH models, GARCH-M models, Asymmetric response models,

INFERENCE IN GARCH TYPE MODELS: Inference under conditional normality, Inference under conditional Student assumption, Semi-parametric approach, Examples

MULTIVARIATE GARCH MODELS: CCC multivariate GARCH models, DCC models, Inference, Examples, Asymmetry

KALMAN FILTER AND EXTENSIONS: Definition of a linear factor model, Kalman filter, Kalman smoother, Estimation and tests, Extended Kalman Filter of order 1, Extended Kalman Filter of order 2, Quadratic Kalman Filter

APPLICATIONS OF THE KALMAN FILTER: Value at Risk modeling, Multivariate Factor GARCH models, Stochastic volatility models.

HIDDEN MARKOV CHAINS: Markov chains, Switching regime models, Kitagawa-Hamilton algorithm, EM algorithm, Coding, Parameterization of the transition matrix.

DISCRETE TIME AFFINE PROCESSES

Laplace Transform, Affine processes, Examples, Multi-Horizon Laplace Transform, Applications, Extended Affine Processes, Truncated Laplace Transform

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