Time Series Analysis

Course Road Map

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Course Road Map

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About This Lesson

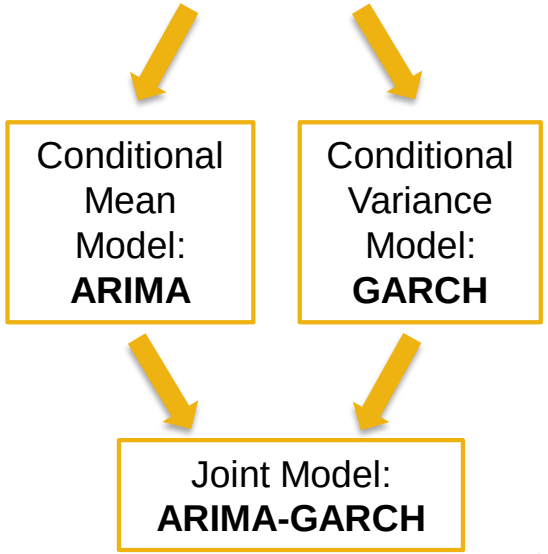
Course Road Map

Pre-requisite: Basic Statistical Modeling & Inference

Basic Time Series Modeling

- Trend
- Seasonality
- Serial Dependence
- Prediction

Univariate Analysis



Multivariate Analysis

- Correlation between & within time series
- Multivariate AR model (VAR)

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Course Road Map: Pre-requisite

Pre-requisite: Basic Statistical Modeling & Inference

- *Distribution of a Random Variable*
- *Statistical Estimation*
- *Statistical Inference*
- *Regression Analysis*

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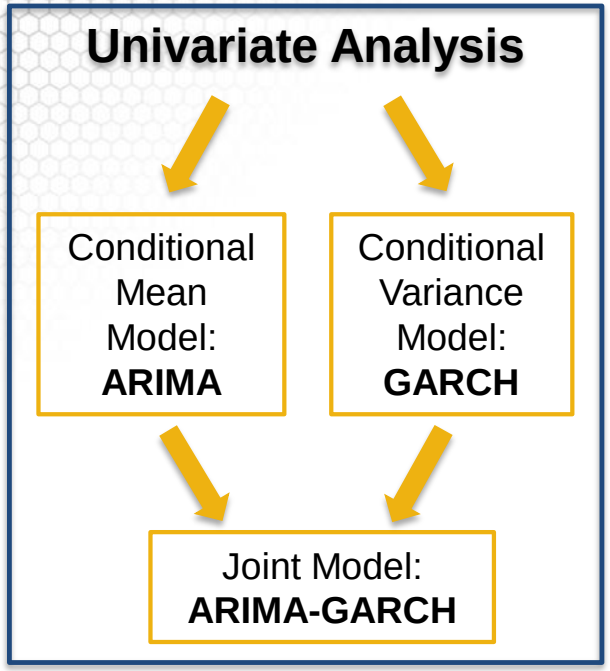
Course Road Map: Basic Concepts

Basic Time Series Modeling

- Trend
- Seasonality
- Serial Dependence
- Prediction

- *Time Series Definitions*
- *Basic Decomposition: Trend & Seasonality analysis*
- *Stationarity: The basic concept for all time series models*
- *Prediction: Best Linear Predictor*

Course Road Map: Univariate Analysis



Modeling (Time) Conditional Mean

- *Stationary Time Series: ARMA*
- *Non-stationarity: ARIMA*
- *Seasonality: Seasonal ARIMA*
- *Model Selection*
- *Prediction: Best Linear Predictor*

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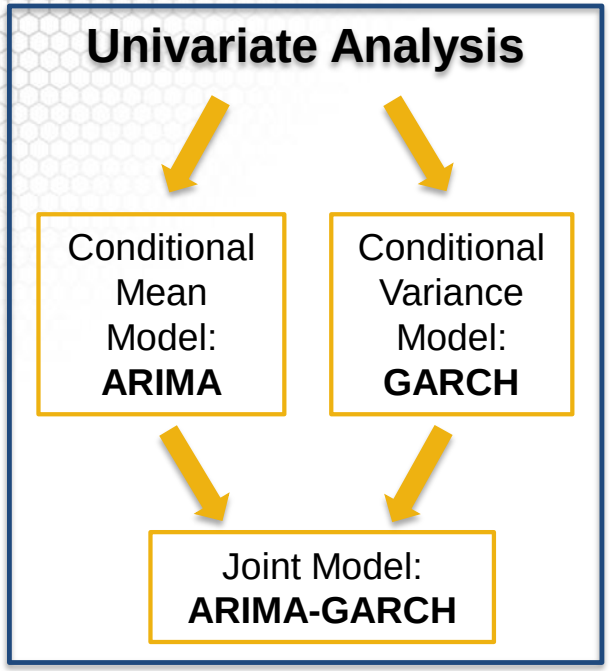
Course Road Map: Univariate Analysis



Modeling (Time) Conditional Variance

- *Conditional Variance or Volatility*
- *GARCH*
- *Joint ARMA-GARCH*
- *Extended GARCH*
- *Prediction of Volatility*

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Course Road Map: Multivariate Analysis

Multivariate Analysis

- Correlation between & within time series
- Multivariate AR model (VAR)

- *Univariate vs Multivariate Time Series*
- *Vector Autoregressive (VAR) Model*
- *Model Selection and Interpretation*
- *Granger Causality and Prediction*
- *Generalizing the VAR*

Other Time Series Analysis Models

- Univariate Time Series Modeling under Stationarity:
  - ARIMA Modeling
  - Spectral Analysis
- Univariate Time Series Modeling under Heteroskedasticity:
  - GARCH Modeling
  - High Frequency Data
- Multivariate Time Series Modeling:
  - VAR Modeling
  - State Space Modeling
  - Functional Data Analysis

Summary

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