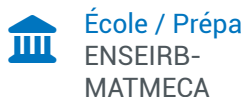


Time series analysis and prediction in business and finance



Présentation

Code interne : ETE9-TSIG7

Description

This course aims to focus on the empirical challenges faced by practitioners in business and finance. Moreover, the course will follow a bottom-up approach. That is, starting with empirical examples taken from the business world, the course will consider widely spread time series tools also integrating relevant business dynamics such as persistence, volatility, seasonality, intermittent data. The course will make use of some large dataset such as Walmart and Sephora daily retail sales. Those will be used to identify the challenging dynamics features faced by practitioners. In addition, the course will introduce a recent Python algorithm that allows to evaluate investment decisions using stock market data (CAC40). At the end of the course, the student will acquire the following skills: (1) Master standard time series and tools (2) Master real time forecasting of business data. (3) Compare and improve the prediction performance of alternative models.

Plan

I/ Forecasting in business and finance: Main challenges and empirical features faced by practitioners

II/ Modelling times series using Autoregressive Moving Average processes: Standard and alternative state-space approaches

III/ ARMA prediction: analytical derivation of point forecasts and prediction intervals

IV/ Stationary versus non-stationary (persistent) time series models comparing ARMA versus Exponentially weighted moving average. Examples using Walmart data

V/ Modelling seasonality: Additive and Multiplicative seasonal adjustments versus SARMA modelling

VI/ Modelling volatility: understanding the ARMA-GARCH approach and the impact of volatility on the likelihood function

VII/ Intermittent data: challenges and solution (Non-negative ARIMA modelling and Markov chains)

VIII/ On comparing alternative prediction models: introducing the M4 and M5 forecast competitions

Heures d'enseignement

CI

Cours Intégrés

13,33h

Pré-requis obligatoires

ETE5-MATH1 (Probabilités)

ETE6-TSIG1 (Processus et signaux aléatoires)

ETE7-MATH1 (Statistiques)

Modalités de contrôle des connaissances

Évaluation initiale / Session principale

Type d'évaluation	Nature de l'évaluation	Durée (en minutes)	Nombre d'épreuves	Coefficient de l'évaluation	Note éliminatoire de l'évaluation	Remarques
Contrôle Terminal	QCM	60	1			Sans document, ni calculatrice autorisée

Infos pratiques

Contacts

Responsable module

Pascal Vallet

✉ Pascal.Vallet@bordeaux-inp.fr