SMR
Stochastic Modelling, Statistics and Risk Analysis

Direction FFR

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Risk and Stochastics

Structure of FFR: 3 specializations

One or all?

This depends on your interests and specialization possibilities

MATHEMATICAL FINANCE AND ENERGY
INSURANCE
RISK AND RELIABILITY ANALYSIS

All directions have some compulsory courses, and some elective courses. You can combine them! Feel free to talk to us.

Total: 120 study points = $\begin{cases} 60\ courses + 60\ master\ thesis \\ 90\ courses + 30\ master\ thesis \end{cases}$

Mathematical Courses

- MAT4720 Stochastic Analysis and Stochastic Differential Equations
- MAT4710 Probability Theory
- MAT4790 Stochastic Filtering
- MAT4740 Malliavin Calculus and Applications to Finance
- STK4550 Extreme Value Statistics and large Deviations
- MAT4760 Advanced Mathematical Methods in Finance
- Courses in Functional Analysis, Partial Differential Equations and Machine Learning

Finance & Energy Courses

- STK-MAT4700 Introduction to Mathematical Finance and Investment Theory
- MAT4770 Stochastic Modelling in Energy and Commodity Markets
- MAT4750 Mathematical Finance: Modelling and Risk Management.
- STK4530 Interest Rate Modelling via SPDEs.

Insurance

- STK4505 Problems and Methods in Actuarial Science
- STK4540 Non-Life Insurance Mathematics
- STK4500 Life Insurance and Finance

Risk and Reliability

- STK4405 Introduction to Risk and Reliability Analysis
- STK4400 Risk and Reliability Analysis

Master thesis

- Financial and Insurance: financial derivatives, bonds and interest rates, and model analysis.
- Commodity markets, energy markets, freight markets.
- Stochastic volatility modeling.
- Environmental risk factors into markets prices.
- Risk measures and monetary risk evaluations.
- Insurance: Solvency II.
- Reservoir production, performance, reliability of components.
- Modeling, hedging, optimization.
- Numerical methods (stochastic and deterministic).
- Machine learning and applications

Long or short master thesis?

Your choice!!

In FFR it is important to get a good background.

- If you have 90 points on courses, then you get directly into the exciting part of the master's thesis (30 points).
- If you only have 60 points on courses, then you have to work harder to get into the heart of the thesis.

Both must be well written and skilful to obtain top marks.

Both can lead to exciting jobs and also a doctorate!

Supervisors







Finance, energy, risk measurement,
risk management, control theory,
probability theory, stochastic analysis
statistics, reliability analysis,
numerical methods ...
SECTION 3 – Risk and Stochastics

Examples

- Machine learning techniques in interest rate modelling. Mathias Kristiansen. Consultant at KPMG. (Ortiz-Latorre)

- Dynamic risk measures generated by time-chnaged BSDEs with jumps. Siyu Zhou. Data Scientist at Telia Norge. (Di Nunno)

Examples

- A functional approach to forward rate modelling. Kim André Arnstsen. Pricing Actuary at Codan Norway. (Benth)
- Prospective Reserves of Life Insurance Policies under the Heath-Jarrow-Morton Framework. Åsmund Hausken Sande. PhD student in our section. (Baños)

Examples

- Unit-Linked Insurance Policies in the Presence of Credit Risk. Håkon Nortvedt. Actuary at Fremtind Forsikring (Proske)
- Optimizing bivariate reinsurance with dependent risks. Xiaofei Li. (Huseby)