Advance Course
on
Safety Risk Assessment Based Stochastic Analysis

with special emphasis on Air Traffic Management

✈ Aim

To equip researchers in university and industry with advanced tools of stochastic analysis for risk assessment

✈ Who Should Attend?

Ph.D. students, post docs and research analysts who need to understand:

- Basic tools of stochastic analysis
- Advanced Monte Carlo methods for risk assessment
- Both dynamic and colored petri net modelling of stochastic hybrid systems

✈ Course Content

Module	Content
Modelling Accident Risk in Air Traffic	- General concepts for modelling accident risk - TOPAZ methodology - Bias and uncertainty assessment
Modelling Stochastic Hybrid Systems	- Brief introduction to stochastic differential equations - Jump diffusion processes - Stochastic hybrid models
Monte Carlo simulation of Rare Events	- Rare event simulation methods - Interactive particle systems method - Application to stochastic hybrid models
Dynamically Colored Petri Net	- Dynamically colored Petri net(DCPN) - Mapping between PDP (piecewise deterministic processes) and DCPN - Advanced en route air traffic example

The course

- Focuses on concepts
- Builds up from simple to more complex
- Includes hands-on exercises to reinforce key learning points

✈ Duration

2 days

✈ Cost

TO BE DECIDED

COURSE ORIGIN

This advanced course has been developed as part of the Hybridge Project on Safety Risk Assessment funded by the EU …… The focus of this course is exclusively on stochastic analysis techniques applied to safety risk assessment of air traffic management.

COURSE CONTENT

The ultimate purpose of this course is to familiarize academic researchers and safety risk assessment professionals with the latest results obtained in the “HYBRIDGE” project on stochastic analysis that play central role in advanced safety risk assessment in air traffic (http: www.nlr.nl/public/hosted-sites/hybridge/. All necessary background material necessary to understand these latest developments are carefully developed in this course.

COURSE FORMAT

The course is composed of four modules:

- Modeling Accident Risk in Air Traffic
- Modeling Stochastic Hybrid Systems
- Monte Carlo Simulation of Rare Events
- Dynamically Colored Petri Net

There will be two one-hour lectures for each module followed by an exercise session. Two modules will be covered on each day. On the evening of the first day, course participants will simulate and experiment with various air traffic collision scenarios. Demonstration and explanation of an advanced air traffic example developed at the Netherlands Aerospace Laboratory NLR will follow the last module.

COURSE VENUE

The first round of the course will be offered on the campus of the University of Twente in the Netherlands. The number of participants is limited and all participants will be housed in the campus hotel.