Research on Stochastic Modeling and Optimization

This version: (First official draft)

Course instructors

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Application procedure

Goal and target audience

Early-stage PhD students in operations, logistics and supply chain management with an Operations Research and modelling background.

Application process

Apply until November 30, 2022 by sending an email to: stefan.minner@tum.de

Course aims

What this course is

A structured introduction to learning methodological approaches for successful research in stochastic models in logistics and supply chain management at the beginning of the PhD program. It is expected that all participants will prepare one core topic (including some implementation) and present this to the other participants.

What this course is not

A listen and repeat lecture.

Course objectives

Knowledge Objectives

State-of-the-art stochastic modelling and optimization approaches required for state-of-the-art research: Stochastic Processes, Markov Decision Processes and Markov Games, Reinforcement Learning, Stochastic Programming, Simulation Optimization.

Skills Objectives

Application of the methods to logistics and supply chain management problems and their implementation.

Learning Objectives

Learn how to apply, adapt, use these methods for own research work and how to write and publish a scientific manuscript.

Preliminary schedule

Kickoff-Meeting on December 5, 1pm in room 1577.
3 day block course on February 20 - 22, 2023

Core readings

Tijms, H.C. (2003). A First Course in Stochastic Models. Wiley.
Powell, W.B. (2021). Reinforcement Learning and Stochastic Optimization. Wiley
Kleijnen, J.P.C. (2015). Design and Analysis of Simulation Experiments. 2nd ed. Springer.

Course procedures

Latest research topics and challenges will be presented and discussed and venues for innovative research followed. The course focuses on stochastic modeling and optimization methods for decision support and covers recent research contributions in several fields of logistics and operations. Knowledge of the Master-level course Stochastic Modeling and Optimization at the chair of Logistics and Supply Chain Management is a pre-requisite for this advanced research seminar.

Assessment

Presentation of 60 minutes on one of the state-of-the-art topic and sample implementation of a method to a research topic.

Workload

3 ECTS (21 hours lectures, 90 hours total workload)