**Universität Stuttgart**

**INSTITUT FÜR
KOMMUNIKATIONSNETZE
UND RECHNERSYSTEME**
Prof. Dr.-Ing. Andreas Kirstädter

Master thesis No. 1006
## Combinative Path Routing through Network Problem Subdivision

**Methods**
Programming in Java
Prototype implementation

**Topics**
Network control
Routing reconfiguration

### Background

Modern optical networks need to continue improving in order to keep up with the demanding requirements of the market. Part of today's requirements is the need of network operators to automatically control the network towards its benefit and also to quickly adapt it to decisions concerning service changing schemes or policy strategies in the context of multi-domain networks.

In this master thesis project, you will develop a prototypical routing scheme that is planned to be used for the reconfiguration in a dynamic traffic model. The routing method is inspired by the mechanism of the "divide-and-conquer" algorithm family and is expected to efficiently address the aforementioned challenges by subdividing the general network routing problem into smaller routing problems, which are then individually solved. In a final step, the solutions are constructively combined to yield the overall routing table. The design of the routing scheme should ease parameterization without overly increasing the computational complexity.

### Problem Description

This master thesis project includes the design, implementation and evaluation of the prototype routing method and can be structured into the following steps:

- Literature investigation on routing algorithms and algorithmic efficiency

- Design and implementation of a network subdivision algorithm

- Design and implementation of a function to constructively combine individual solutions into one overall solution

- Simulative evaluation of the developed algorithm and comparison with a reference method

### Acquired Knowledge

You will become familiar with network routing mechanisms and you will employ your creativity to solve a prototypical problem in a well known scenario. Moreover, you will acquire experiences on working with a modular, object-oriented software framework for the simulation of multi-layer optical networks, and you will learn to analyze and evaluate your developed algorithm.

**Requirements**
Communication Networks Architecture and Design
Programming Experience in Java/C++

**Desirable knowledge**
Kommunikationsnetze I

### Contact

Dipl.-Ing. Filippos Christou
room 1.319 (ETI II), phone 685-67968, E-Mail filippos.christou@ikr.uni-stuttgart.de

M.Sc. Arthur Witt
room 1.403 (ETI II), phone 685-69015, E-Mail arthur.witt@ikr.uni-stuttgart.de

M.Sc. Tobias Enderle
room 1.402 (ETI II), phone 685-67992, E-Mail tobias.enderle@ikr.uni-stuttgart.de