Abstracts

Requests for copies of papers must be sent direcly to the authors, whose addresses are listed in this volume, and not to section chairmen, commitee members, or the conference office.

The abstracts are ordered per section and according to the schedule within each section. For an alphabetic ordering, use the index of speakers.

Tuesday, August 30, 11:30, Room H105

Telecommunications and OR: New Challenges

Clyde L. Monma, Bell Communications Research Center Morristown

The telecommunications industry is going through a period of very rapid change due to many factors, including

(1) the impact of new and emerging technologies;
(2) the convergence of computing, communications and entertainment; and
(3) government regulatory policies in response to global competition.

The current situation provides an exciting opportunity for Operations Research to make a significant impact and to help shape the future of the telecommunications industry.

This talk will describe some of the new opportunities and challenges for telecommunications and OR in this new environment. The talk will also include some specific examples illustrating the impact OR is already having on telecommunications.

Wednesday, August 31, 11:30, Room H105

Probleme flexibler Fertigung

Horst Tempelmeier, Universität zu Köln

Von der Einführung hoch automatisierter flexibler Produktionssysteme (z. B. FFS, flexible Transferstraßen) hat man sich in der betrieblichen Praxis viel versprochen. Allerdings zeigt die Erfahrung, daß viele Hoffnungen nicht erfüllt wurden. Im vorliegenden Beitrag wird der Frage nachgegangen, welche Ursachen dafür verantwortlich sein können. Es wird gezeigt, daß für den wirtschaftlichen Betrieb eines flexiblen Produktionssystems zahlreiche Entscheidungsvariablen - sowohl bei der Konfiguration als auch während des laufenden Betriebs - simultan optimiert werden müssen. Optimierung setzt aber ein grundlegendes Verständnis der funktionalen Beziehungen zwischen den Variablen voraus. Der Beitrag soll das Potential von OR-Modellen für die Planung flexibler Produktionssysteme aufzeigen.

Wednesday, August 31, 11:30, Room H104

Optimal Design of Mechanical Structures

Jochem Zowe, Universität Bayreuth

The optimization of shape, topology and material properties of discrete (and continuum) structures has great impact on the performance of such structures. Hence recent years have seen a revived interest in this area of structural optimization, which combines elements of mechanics, variational calculus and mathematical programming.

We discuss in detail the mathematical modelling of discrete structures consisting on n nodes and m potential nodal connections (so-called trusses; e.g. the layout of a bridge, an electricity mast,...). The design variables (controls) are the positions of the nodes and the cross-sections of the bars; the displacements of the nodes under a given load define the state variable of the system. The aim is to choose the controls such that the truss becomes as stiff as possible with respect to the given load. The mechanical–mathematical model leads to a nonconvex constrained mathematical programming problem in $n + m$ design and m state variables. Already for planar models n and m will be of order $10^2 - 10^3$ and $10^3 - 10^4$, respectively.

Classical software fails in this context and new ideas are required. We will present two ideas how one can optimize such trusses simultaneously with respect to the cross-sections of the bars and the positions of the nodes. Both approaches use concept and codes from nonsmooth optimization. A number of test problems (cantilever arm, simple and double arch bridge,...) will demonstrate the effectivity of both approaches.

Friday, September 2, 09:00, Room H105

Vehicle Routing and Traffic Simulation

Achim Bachem, Universität zu Köln

In the first part of the talk we survey recent work of real life vehicle routing problems found in different industry branches. We report on new solution techniques to solve complex vehicle dispatch problems with time windows. In addition we shall present some new challenges which show up when designing computer aided dispatching systems in an industrial environment.

The second part is devoted to implementions of microscopic and mesoscopic models to simulate the dynamic evolution of complex traffic networks. The microscopic system is used to study traffic congestions and to understand their emergence. We report on recent developments on real-time simulations of the German highway network using parallel computers and discuss their impact on advanced transport telematics systems.