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BULLETIN

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Dezember/Décembre 2020

SCHWEIZERISCHE VEREINIGUNG FÜR OPERATIONS RESEARCH

ASSOCIATION SUISSE DE RECHERCHE OPERATIONNELLE

ASSOCIAZIONE SVIZZERA DI RICERCA OPERATIVA



**OR 2021, International Conference on Operations Research
August 31 - September 3, 2021, University of Bern**

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Délai pour les contributions au bulletin no. 157 d'avril 2021 (prévu)

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31.03.2021

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Editorial

Dear members

The COVID-19 pandemic has changed many things in our lives, including this time of the year when you receive the new SVOR/ASRO bulletin. Many planned events related to SVOR/ASRO had to be cancelled; however, thanks to the commitment of many of our colleagues, I have the pleasure to report on some successful events and activities that did take place.

On November 15, 2019, Maria Grazia Speranza received the doctorate honoris causa from the University of Fribourg. Maria Grazia Speranza is Full Professor of Operations Research at the Department of Economics and Management at the University of Brescia (Italy). She has served as president of the EURO, and is currently president of IFORS. On November 14, she gave an impressive presentation about Operations Research and sustainability in transportation and logistics at the University of Fribourg.

From January 19 to 24, 2020, another edition of the Winter School on Optimization and Operations Research took place, once again perfectly organized by Michel Bierlaire. The event was a great success with exciting lectures given by Negar Kiyavash (EPFL) and Marco Campi (University of Brescia), interesting presentations delivered by our PhD students and plenty of happy participants.

The OR days 2020, which were planned to take place at ZHAW in Winterthur, unfortunately had to be cancelled. We are now looking forward to the general assembly, which will be held online on December 18, 2020. With this bulletin, you receive the invitation to the general assembly; please register via e-mail in order to get the link to the online event.

This year, SVOR/ASRO awards prizes for the best PhD thesis and the best Master thesis. Normally, we hand over the prizes during the general assembly. Due to its special format this year, the board has decided to announce the winners in this bulletin. Many congratulations to the winners, Iliya Markov and Nicolas Lanzetti!

For 2021, two major events in Operations Research are planned in Switzerland. The Winter School in Zinal, initially announced for January 2021, has been postponed and can hopefully take place in spring 2021. Together with our colleagues from Austria, our society has been invited by the German OR society to co-organize the annual conference on Operations Research, which will take place at the University of Bern from August 31 to September 3. I kindly invite you to attend the conference and contribute a talk about your recent research. Please visit the website or2021.unibe.ch to stay updated.

I am looking forward to meeting you virtually at our general assembly or, hopefully in person, at some of the mentioned events. I take the opportunity to thank all colleagues who have contributed to the success of SVOR/ASRO during these unprecedented months.

Best regards, and stay healthy!

Norbert Trautmann

President of SVOR/ASRO

November 21, 2020

Maria Grazia Speranza : Docteure Honoris Causa de l'Université de Fribourg

Prof. Dr. Marino Widmer, Prof. Dr. Bernard Ries, University of Fribourg

L'année 2019 a été une année particulièrement réjouissante pour la recherche opérationnelle fribourgeoise. En effet, après Bernard Roy en 1982 et Dominique de Werra en 2010, nous avons eu l'immense honneur de décerner le titre de Docteure Honoris Causa à une autre personne mondialement connue dans notre domaine et qui s'investit sans cesse pour la promotion de la RO : la professeure Maria Grazia Speranza de l'Université de Brescia (Italie).



*Marino Widmer, Maria Grazia Speranza,
Bernard Ries, Dominique de Werra
(de g. à d.)*



*Martin Wallmeier (Doyen de la Faculté des
SES), Maria Grazia Speranza, Bernard Ries
(de g. à d.)*

Au niveau de ses activités de recherche, Maria Grazia Speranza bénéficie d'un rayonnement international incontesté. En effet, elle a notamment contribué à l'amélioration des performances des heuristiques de résolution des problèmes de programmation linéaire en nombres entiers mixtes (MILP) par l'utilisation d'une approche appelée Kernel Search, qu'elle a appliquée avec succès à des problèmes d'optimisation de portefeuille, de chaîne logistique ou de localisation. Elle a également axé une partie de sa recherche sur la résolution de problèmes de tournées de véhicules par le biais de métaheuristiques et de matheuristiques.

Elle a écrit ou co-écrit plus de 200 articles dont la grande majorité a été publiée dans des revues scientifiques très bien cotées. Elle est éditrice associée de 15 revues internationales, dont International Journal of Portfolio Optimization et International Transactions in Operations Research (ITOR).

Outre ses activités scientifiques, elle s'investit dans la promotion de la recherche opérationnelle. Elle est présidente de la Fédération Internationale des sociétés de recherche opérationnelle (IFORS) depuis janvier 2019, après avoir été présidente de EURO, l'association des sociétés européennes de recherche opérationnelle de 2011 à 2012.

En étant une des cent expertes du projet italien “100 Donne per la Scienza”, elle contribue également à développer l’intérêt des étudiantes pour les matières scientifiques.

Le jeudi 14 novembre, Maria Grazia Speranza a donné une conférence intitulée « Operations Research for sustainability in transportation and logistics » à laquelle ont assisté de nombreux membres de la Faculté des SES de l’Université de Fribourg ainsi que de la communauté suisse de RO. Lors du Dies Academicus de l’Université de Fribourg le 15 novembre 2019, le titre de Docteur Honoris Causa a été décerné à Maria Grazia Speranza, devenant ainsi la première femme à obtenir ce titre de la part de la Faculté des sciences économiques et sociales et du management de Fribourg.

Une interview (en italien) et quelques images de la cérémonie se trouvent sur la page web du groupe DS&OR sous www3.unifr.ch/inf/dsor/en/news

L’Université de Fribourg et sa Faculté des SES sont fières de pouvoir reconnaître les mérites de la Professeure Maria Grazia Speranza en lui conférant le titre de Docteur Honoris Causa.

SVOR/ASRO Awards 2020: The Winners

We are pleased to announce the winners of the SVOR/ASRO Awards 2020 for the best doctoral and master thesis and congratulate them on their outstanding work.

SVOR/ASRO Award 2020 for Best PhD Thesis

The winner is *Iliya Markov, EPF Lausanne*, with his work on "Rich Vehicle and Inventory Routing Problems with Stochastic Demands", supervised by Prof. M. Bierlaire (EPF Lausanne), Prof. S. Varone (HEG), Prof. J.-F. Cordeau (HEC Montréal), Prof. M. G. Speranza (University of Brescia), and Prof. D. Kuhn (EPF Lausanne).

Important topics for companies are addressed in this thesis, such as demand forecasting, rich vehicle routing problems, and inventory routing problems, taking into account the stochastic aspect generated by undesirable events. To solve these problems, Iliya Markov has developed optimisation models based on Mixed Integer Linear Programming (MILP) and Mixed Integer Non-Linear Programming (MINLP) formulations. He also developed a metaheuristics approach based on Adaptive Large Neighbourhood Search (ALNS). The theoretical foundations of this thesis are therefore strong, and they allow the design of an interesting unified framework for rich routing problems with stochastic demands (Chapter 4, where the author highlights several application examples). Two real case studies are integrated in this PhD thesis.

At least 4 scientific papers are derived from the thesis, which are or will be published in internationally renowned journals (three in Transportation Research and one in Computers & Operations Research).

SVOR/ASRO Award 2020 for Best Master Thesis

The winner is *Nicolas Lanzetti, ETH Zurich*, with his work on "Do Self-driving Cars Swallow Public Transit? A Game-theoretical Perspective on Transportation Systems ", supervised by Prof. M. Schiffer (Technical University Munich), Prof. M. Pavone (Stanford University), Prof. E. Frazzoli (ETH Zurich)

The candidate is working on the interaction between a fleet of self-driving cars and public transport for a mobility scenario. For this purpose, he is using a game-theoretical framework that includes a network flow model of a transportation system. He then shows that the equilibrium of this setting can be found by solving a quadratic program. The approach chosen by the candidate (game-theoretical framework) is being used for the first time for the considered problem. The insights obtained that way are of interest for both practitioners and academics. The methodology is also applied to a real world data set from the city of Berlin, allowing to detect major impact factors and provide design options for policy makers regarding the interaction between an autonomous mobility-on-demand system and public transport.

Announcements

OR 2021: International Conference on Operations Research

31 August - 3 September 2021, University of Bern, Switzerland

www.or2021.unibe.ch

International Conference on Operations Research

August 31 – September 3, 2021 / University of Bern, Switzerland
Joint annual conference of the Operations Research Societies of
Switzerland, Germany and Austria. Format adaptive to COVID-19.
www.or2021.unibe.ch / or2021@pqm.unibe.ch

OR 2021

OPERATIONS
RESEARCH
BERN



OR 2021, the joint annual conference of the Operations Research Societies of Switzerland (SVOR), Germany (GOR e.V.) and Austria (ÖGOR) will take place from August 31 to September 3, 2021, at the University of Bern in the beautiful capital of Switzerland. The theme of the conference is «Business Analytics for Data-Driven Decision Making». We invite academics and practitioners from business economics, mathematics, computer science and related fields to participate and share their research. Abstracts will be accepted from January 15 through April 11, 2021.

Course on Discrete Choice Analysis 2021: Predicting Individual Behavior and Market Demand

8 - 12 February 2021, EPF Lausanne, Switzerland

Online Course

Prof. Dr. Moshe Ben-Akiva (MIT), Prof. Dr. Michel Bierlaire (EPF Lausanne)

transp-or.epfl.ch/dca



Accurate predictions of the demand and market shares are critical for a wide variety of businesses and public organizations. Examples of applications include: predicting demand for a new product under alternative pricing strategies; designing a business plan for a new technology; analyzing the impact of a merger on market shares; forecasting the ridership on a new metropolitan transit service; and analyzing competitive scenarios for introducing a new telecommunication service. To accomplish these tasks, discrete choice analysis provides powerful methodological tools. Based on the modeling of individual behavior, it is used to model in detail the structure of a market, and to predict the impact of various scenarios.

This one-week program undertakes an in-depth study of discrete choice models and their applications. It provides participants with the practical tools necessary for applying new discrete choice techniques. By examining actual case studies of discrete choice methods students will be familiarized with problems of data collection, model formulation, testing, and forecasting and will gain hands-on application experience by using readily available software to estimate and test discrete choice models from real databases. The course will emphasize applications of discrete choice methods to strategic and tactical marketing and to policy-related problems.

The course is coordinated and taught by Prof. Moshe Ben-Akiva, MIT, and Prof. Michel Bierlaire, EPF Lausanne. The following lecturers may also be teaching: Prof. Daniel McFadden, University of Southern California (Nobel Prize Laureate, 2000), and Prof. Joan Walker, University of California, Berkeley.

The course is designed for professionals (from industry and public authorities) and academic researchers (professors, researchers, PhD students), interested in understanding and predicting consumer choices, demand and market share, such as marketing analysts, managers, planners, economists, engineers, operations researchers.

Winter School 2021 on Data Science, Optimization and Operations Research

Hotel Europe, Zinal (VS), Switzerland

Event rescheduled due to Covid-19. New dates will be communicated later.

Prof. Dr. Niao He, ETH Zurich

Prof. Dr. Yurii Nesterov, Catholic University of Louvain, Belgium

transp-or.epfl.ch/zinal



The objective of the Winter School is to expose the audience to modern topics on Data Science, Optimization and Operations Research. Every year, two prominent researchers are invited to provide tutorials on selected topics, and to discuss some of their recent research with the students. Designed for doctoral education, the course is open to academic researchers (professors, researchers, PhD students) and professionals (from industry and public authorities), interested in optimization and operations research.

The course is organized by Prof. Michel Bierlaire, Transport and Mobility Laboratory (TRANSP-OR), School of Architecture, Civil and Environmental Engineering (ENAC), Ecole Polytechnique de Lausanne (EPFL). It takes place in Zinal, a ski resort in the Swiss Alps. The special environment triggers a specific atmosphere that encourages scientific and personal exchanges among the participants.

In addition to the lectures, workshops will be organized every day where the students will have the opportunity to work on recent papers of the invited lecturers, under their guidance.

The course is designed for academic researchers (professors, researchers, PhD students) and for professionals (from industry and public authorities) interested in data science, optimization and operations research. It is not an introductory course. Therefore, it is expected that participants have a background in statistics, optimization and operations research.

Generalversammlung / Assemblée Générale

Einladung zur 59. Generalversammlung 2020

Invitation à la 59ème Assemblée Générale 2020

Gerne laden wir Sie zur SVOR Generalversammlung 2020 ein, welche dieses Jahr aufgrund der speziellen Umstände *online* mit der Kommunikationsplattform *Microsoft Teams* stattfindet.

Nous sommes heureux de vous inviter à l'Assemblée Générale 2020 de l'ASRO, qui cette année aura lieu *en ligne* avec la plateforme de communication *Microsoft Teams* en raison des circonstances particulières.

Freitag, 18. Dezember 2020

14:00 - 15:30

Vendredi, 18 décembre 2020

14:00 - 15:30

Online via *Microsoft Teams*

Tagesprogramm / Programme du jour

14:00 - 15:30 59. Generalversammlung 2020

59ème Assemblée Générale 2020

Traktanden

1. SVOR Preise 2020
2. Protokoll der 58. Generalversammlung 2019
3. Jahresbericht 2019
4. Geschäftsbericht und Rechnung des Geschäftsjahres 2019
5. Revisionsbericht und Entlastung des Vorstandes
6. Budget 2021
7. Mitgliederbeiträge 2020
8. Varia

Ordre du jour

1. Prix ASRO 2020
2. Procès-verbal de la 58ème Assemblée Générale 2019
3. Rapport annuel 2019
4. Rapport de gestion et comptes de l'exercice 2019
5. Rapport des vérificateurs des comptes et décharge du comité
6. Budget 2021
7. Cotisation des membres 2020
8. Divers

Anmeldung / Inscription (bis 14. Dezember 2020 / jusqu'au 14 décembre 2020):

- Bitte melden Sie sich **per E-Mail** an office@svor.ch an, unter Angabe von Name, Adresse und E-Mail Adresse.
Sie werden dann vor dem 18.12. eine **E-Mail mit einem Link erhalten**, mit welchem Sie sich auf **Microsoft Teams** zur Generalversammlung zuschalten können.
- Veuillez-vous inscrire par e-mail à office@svor.ch, en indiquant votre nom, votre adresse et votre adresse e-mail.
Vous recevrez ensuite un **e-mail** avant le 18.12. avec **un lien** vous permettant de vous connecter aux **Microsoft Teams** pour l'Assemblée Générale.

Protokoll der 58. Generalversammlung 2019

vom 7. Juni 2019 in Lausanne

Traktandenliste

1. SVOR-Preis 2019
2. Protokoll der 57. Generalversammlung 2018
3. Jahresbericht 2018
4. Geschäftsbericht und Rechnung des Geschäftsjahres 2018
5. Revisionsbericht und Entlastung des Vorstandes
6. Budget 2020
7. Mitgliederbeiträge 2019
8. Wahl der Vorstandsmitglieder
9. Varia

Um 14:00 Uhr begrüsst der Präsident der SVOR, Norbert Trautmann, die anwesenden 14 Vereinsmitglieder zur Generalversammlung und stellt deren Beschlussfähigkeit fest. Die im Bulletin Nr. 154 veröffentlichte Traktandenliste wird einstimmig genehmigt.

1. SVOR-Preis 2019

Im Frühjahr 2019 organisierte die SVOR den Optimierungs-Wettbewerb "Mission: possible -- Cheese Hunting" für Gymnasiastinnen und Gymnasiasten. Bernard Ries, Ola Svensson und Norbert Trautmann haben die Problemstellung ausgearbeitet, die eine Variante des Handlungsreisendenproblems darstellt. Die Beschreibung des Problems sowie zwei Datensätze wurden über eine Online-Plattform zur Verfügung gestellt, über die die Teilnehmenden auch ihre Lösung einreichen konnten. Mit 2049 Zugriffen auf die Problembeschreibung, 56 angemeldeten Teilnehmenden und 48 Einreichungen war der Wettbewerb äusserst erfolgreich. Die drei besten Lösungen wurden eingereicht von Hannes Eberhard (1. Platz; 18jährig, Gymnasium Oberwil), Liam Braun (2. Platz; 16jährig, Kantonsschule Zürcher Oberland) und Yanta Wang (3. Platz; 16jährig, ebenfalls Gymnasium Oberwil). Liam Braun und Yanta Wang präsentierten an der Generalversammlung ihre äusserst innovativen Lösungsansätze und erhielten unter grossem Applaus ihre Preise.

2. Protokoll der 57. Generalversammlung 2018

Das Protokoll der 57. Generalversammlung ist im Bulletin Nr. 154 veröffentlicht worden. Es wird von der Versammlung einstimmig genehmigt.

3. Jahresbericht 2018

Der Präsident verliest den Jahresbericht 2018. Die wichtigsten Ereignisse dieses Jahres sind nachfolgend zusammengefasst:

- Es fanden insgesamt zwei Sitzungen des Vorstands statt, am Mittwoch 24. Oktober 2018 und am Donnerstag 6. Juni 2019. Seit etlichen Jahren nutzt der Vorstand vermehrt die Mittel zur Kommunikation auf Distanz und reduziert dadurch den Zeitaufwand für Anfahrtswege und die Kosten für die Organisation von Sitzungen.

- Die 16. Swiss OR Days 2018 fanden am Donnerstag 12. und Freitag 13. Juni 2018 an der Universität Bern statt, organisiert von Philipp Baumann und Norbert Trautmann. Gemeldet waren insgesamt 33 Teilnehmende. Keynote Speakers waren Prof. Dr. Alexandre Alahi (EPF Lausanne), Prof. Dr. Francesco Corman (ETH Zürich) und Prof. Dr. Bernard Ries (Université de Fribourg).
- Vom 13. bis zum 18. Januar 2019 fand in Zinal (VS) erneut die Winter School on Optimization and Operations Research statt, organisiert von Michel Bierlaire. Es nahmen 55 Personen aus dem In- und Ausland teil. Die Vorlesungen wurden von Prof. William Pulleyblank (United States Military Academy, West Point) und Louis-Martin Rousseau (Polytechnique Montréal) gehalten. An zwei Nachmittagen stellten die teilnehmenden PhD-Studierenden in 8 Gruppen Papers der beiden Dozenten vor und hatten zuvor die Möglichkeit, mit ihnen ausführlich Fragen zu den Papers zu diskutieren.
- An der EPFL Lausanne fanden zwei von Michel Bierlaire organisierte Workshops statt, nämlich vom 24. bis zum 28. März 2019 der Workshop on Discrete Choice Analysis (23 Teilnehmende) und vom 25. bis zum 27. April 2019 der Workshop on Discrete Choice Models (20 Teilnehmende).
- Dank des unermüdlichen Einsatzes von Andreas Klinkert wurden zwei Bulletins publiziert, Nr. 153 im Oktober 2018 und Nr. 154 im April 2019.

4. Geschäftsbericht und Rechnung des Geschäftsjahres 2018

Marco Laumanns präsentiert die Vereinsrechnung 2018, welche die SVOR mit einem Gewinn von CHF 3101.27 abschliesst. Positiv ausgewirkt hat sich u.a. ein Förderbeitrag in Höhe von CHF 2000, den der Präsident bei der SATW einwerben konnte.

5. Revisionsbericht und Entlastung des Vorstandes

Der Revisionsbericht von Martin Densing und Matteo Salani wird von Martin Densing verlesen. Sein Antrag auf Genehmigung der Jahresrechnung und Entlastung des Vorstandes wird einstimmig angenommen.

6. Budget 2020

Marco Laumanns präsentiert das Budget 2020, welches im Bulletin 152 veröffentlicht wurde. Die Versammlung beschliesst auf Vorschlag von Marco Laumanns, für die Defizit-Garantie der Swiss OR Days und anderer Konferenzen insgesamt CHF 3000 einzuplanen. Mit dieser Änderung wird das Budget einstimmig angenommen.

7. Mitgliederbeiträge 2019

Die Mitgliederbeiträge sollen gemäss Antrag des Vorstands unverändert wie im Vorjahr angesetzt werden:

- Studierende und Doktorierende: CHF 0
- Einzelmitglieder: CHF 80
- Kollektivmitglieder: CHF 250

Dieser Antrag wird einstimmig genehmigt. Weiter informiert die Gesellschaft alle Mitglieder, welche die SVOR zusätzlich unterstützen möchten, darüber, dass zusätzliche finanzielle Beiträge herzlich willkommen sind.

8. Wahl der Vorstandsmitglieder und Revisoren

Der bisherige Vorstand wurde als Gesamtheit einstimmig wiedergewählt und bedankt sich für das entgegengebrachte Vertrauen.

Als Revisoren für das Geschäftsjahr 2019 stellen sich erneut Martin Densing und Matteo Salani zur Verfügung und werden einstimmig gewählt.

9. Varia

- Die SVOR wird künftig für ihre Mitglieder relevante Informationen auch per E-Mail versenden. Mitglieder, deren E-Mail-Adresse bekannt ist, werden informiert und haben die Möglichkeit, ihre Adresse von der Verteiler-Liste streichen zu lassen. Mitglieder, deren E-Mail-Adresse nicht bekannt ist und welche die Informationen per E-Mail erhalten möchten, werden gebeten, der Geschäftsstelle ihre E-Mail-Adresse bekanntzugeben.

*Für das Protokoll:
Norbert Trautmann*

Procès-verbal de la 58ème Assemblée Générale 2019

du 7 juin 2019 à Lausanne

Ordre du jour

1. Prix ASRO 2019
2. Procès-verbal de la 57ème Assemblée Générale 2018
3. Rapport annuel 2018
4. Rapport de gestion et comptes de l'exercice 2018
5. Rapport des vérificateurs des comptes et décharge du comité
6. Budget 2020
7. Cotisations des membres pour 2019
8. Election des membres du comité restreint
9. Divers

A 14:00, le président de l'ASRO, Norbert Trautmann, salue les 14 membres présents à l'Assemblée Générale et constate sa validité. L'ordre du jour publié dans le bulletin No. 154 est accepté à l'unanimité.

1. Prix ASRO 2019

Au printemps 2019, le SVOR a organisé le concours d'optimisation "Mission : possible -- La chasse au fromage" pour les lycéens. Bernard Ries, Ola Svensson et Norbert Trautmann ont élaboré le problème, qui est une variante du problème du voyageur de commerce. La description du problème ainsi que deux ensembles de données ont été mis à disposition via une plateforme en ligne où les participants pouvaient également soumettre leur solution. Avec 2049 accès à la description du problème, 56 participants inscrits et 48 soumissions, le concours a été un grand succès. Les trois meilleures solutions ont été soumises par Hannes Eberhard (1ère place ; 18 ans, Gymnasium Oberwil), Liam Braun (2ème place ; 16 ans, Kantonsschule Zürcher Oberland) et Yanta Wang (3ème place ; 16 ans, également Gymnasium Oberwil). Liam Braun et Yanta Wang ont présenté leurs solutions très innovantes lors de l'assemblée générale et ont reçu leurs prix sous de vifs applaudissements.

2. Procès-verbal de la 57ème Assemblée Générale 2018

Le procès-verbal de la 57ème Assemblée générale a été publié dans le bulletin No. 154. Il est approuvé à l'unanimité par l'assemblée.

3. Rapport annuel 2018

Le président lit le rapport annuel 2018, dont les événements les plus importants de cette année sont résumés ci-dessous :

- Le comité restreint s'est réuni à deux reprises, le mercredi, 24 octobre 2018, et le jeudi, 6 juin 2019. Depuis quelques années, le comité exploite davantage les moyens de communication à distance et réduit ainsi la durée des trajets et les coûts d'organisation des séances.
- La 16ème reprise des Swiss OR Days avait lieu du 12 au 13 juin 2018 à l'Université de Berne, organisée par Philipp Baumann et Norbert Trautmann. Il y avait 33 participants et 3 keynote

speakers : Prof. Dr. Alexandre Alahi (EPF Lausanne), Prof. Dr. Francesco Corman (ETH Zurich) und Prof. Dr. Bernard Ries (Université de Fribourg)

- Du 13 au 18 janvier 2019, la "Winter School on Optimization and Operations Research", organisée par Michel Bierlaire (EPF Lausanne), s'est tenue à nouveau à Zinal (VS). Elle a réuni 55 personnes de Suisse et de l'étranger. Les conférences ont été données par le professeur William Pulleyblank (United States Military Academy, West Point) et Louis-Martin Rousseau (Polytechnique Montréal). Les deux après-midi, les doctorants participants ont présenté les travaux des deux conférenciers en 8 groupes et ont eu l'occasion de discuter en détail avec eux des questions relatives aux travaux.
- Deux workshops organisés par Michel Bierlaire ont eu lieu à l'EPF Lausanne, à savoir le Workshop on Discrete Choice Analysis (23 participants) du 24 au 28 mars 2019, et le Workshop on Discrete Choice Models (20 participants) du 25 au 27 avril 2019.
- Grâce à l'engagement de Andreas Klinkert, deux bulletins ont été imprimés, No. 153, octobre 2018, et No. 154, avril 2019.

4. Rapport de gestion et comptes de l'exercice 2018

Marco Laumanns présente les comptes 2018 de l'association : l'ASRO enregistre un bénéfice de 3101.27 CHF. Entre autres, une contribution de sponsoring de 2000 CHF, que le président a pu réunir auprès de la SATW, a eu un effet positif.

5. Rapport des vérificateurs des comptes et décharge du comité

Le rapport des vérificateurs des comptes de Martin Densing et Matteo Salani est présenté par Martin Densing. Sa demande d'approbation des comptes annuels et de décharge du trésorier et du comité est acceptée à l'unanimité.

6. Budget 2020

Marco Laumanns présente le budget 2020, qui a été publié dans le bulletin 152. Sur proposition de Marco Laumanns, l'assemblée décide d'allouer un total de 3000 CHF à la garantie de déficit des Swiss OR Days et d'autres conférences. Avec ce changement, le budget est approuvé à l'unanimité.

7. Cotisations des membres pour 2019

Le comité propose que les cotisations des membres ne subissent aucune modification par rapport à l'année précédente, à savoir :

- Etudiants, doctorants: CHF 0.-
- Membres individuels: CHF 80.-
- Membres collectifs: CHF 250.-

Cette proposition est acceptée à l'unanimité. L'assemblée générale informe les membres qui souhaitent contribuer davantage que toute participation financière additionnelle est la bienvenue.

8. Election des membres du comité restreint

Le comité entier est réélu à l'unanimité. Il se remercie pour la confiance témoignée.

Martin Densing et Matteo Salani sont à nouveau disponibles comme vérificateurs des comptes pour l'exercice 2019 et sont élus à l'unanimité.

9. Divers

- À l'avenir, l'ASRO enverra également des informations importantes à ses membres par courrier électronique. Les membres dont l'adresse électronique est connue seront informés et auront la possibilité de faire retirer leur adresse de la liste de diffusion. Les membres dont l'adresse électronique n'est pas connue et qui souhaitent recevoir les informations par courrier électronique sont priés de communiquer leur adresse électronique au bureau.

Pour le procès-verbal :

Norbert Trautmann

Vereinsrechnung 2019 / Comptes 2019

Aufwand / Dépenses

Ertrag / Recettes

	Aufwand / Dépenses	Ertrag / Recettes	
Bulletin	1535.10		Bulletin
Vorstandssitzungen	0.00		Séances du comité
Post-/Bankspesen	136.40		Frais poste/banque
Mitgliedschaften	752.83		Affiliations
Swiss OR Days	3006.50		Swiss OR Days
Generalversammlung	448.00		Assemblée Générale
SVOR Master Award 2019	0.00		Prix ASRO Master 2019
SVOR Wettbewerb 2019	1151.90		Concours ASRO 2019
Mitgliederbeiträge		8047.53	Cotisations des membres
Spenden		20.00	Dons
Förderbeiträge		0.00	Contributions promotionnelles
Zinserträge		0.00	Intérêts
Total	7030.73	8067.53	Total
Gewinn 2019	1036.80		Profit 2019
Total	8067.53	8067.53	Total

Bilanz per 31. Dezember 2019

Bilan au 31 décembre 2019

	Aktiven / Actifs	Passiven / Passifs	
Postcheckkonto	12097.56		Compte postal
Postfinance Sparkonto	50075.35		Postfinance Compte
Debitoren	0.00		Débiteurs
Kreditoren		0.00	Créditeurs
Kapital per 01.01.2019		61136.11	Capital au 01.01.2019
Gewinn 2019		1036.80	Profit 2019
Total	62172.91	62172.91	Total
Kapital per 31.12.2019	62172.91		Capital au 31.12.2019

Budget 2021

Aufwand / Dépenses	Ertrag / Recettes		
	Aufwand / Dépenses	Ertrag / Recettes	
Bulletin	1600		Bulletin
Mitgliedschaften	800		Affiliations
Vorstandssitzungen	300		Séances du comité
Generalversammlung	1000		Assemblée Générale
Post- und Bankspesen	150		Frais bancaires et postaux
SVOR Master Award 2021	1000		Prix ASRO Master 2021
SVOR Wettbewerb 2021	1150		Concours ASRO 2021
Swiss OR Days (DG)	3000		Swiss OR Days (GD)
Konferenzen (DG)	0		Conférences (GD)
Mitgliederbeiträge		9000	Cotisations des membres
Zinsertrag		0	Intérêts
Sponsoring		0	Sponsoring
Total	9000	9000	Total
Verlust 2021		0	Perte 2021
Total	9000	9000	Total

Winter School on Optimization and Operations Research 2020

Hotel Europe, Zinal, Switzerland, 19 – 24 January 2020

<http://transp-or.epfl.ch/zinal>

Prof. Dr. Philipp Baumann, University of Bern



The winter school continues to attract a growing number of researchers, PhD students, postdocs, professors, and professionals. The list of participants is also getting more international, indicating the increased visibility of the event outside of Switzerland. The scientific program included two series of lectures given by two esteemed researchers.

Negar Kiyavash is a Professor in the College of Management of Technology at the EPFL. She is an expert in machine learning and statistical decision making. Her lecture series focused on causal inference, which is a fundamental research area in data science. She gave an overview of models and algorithms to find causal influence structures and presented her own research contributions in this field.

Marco Campi is a Professor at the Department of Information Engineering at the University of Brescia. In his lecture series he shared his profound knowledge in the field of robust convex optimization. A central part of his tutorial was the scenario approach to stochastic optimization which he vividly illustrated using examples from quantitative finance, machine learning, and control.

In addition to the lectures, the students participated in a workshop where they studied a research paper written by one of the professors. The workshop provided an active exchange between students and professors and resulted in excellent presentations.

Also, in this year the winter school offered a valuable platform for our community to exchange ideas and enjoy the beautiful surroundings in Zinal, something we have learned to appreciate very much in the current time. We are therefore very much looking forward to the next event (see <http://transp-or.epfl.ch/zinal>).

SVOR-Preis 2021 für Masterarbeiten

Die SVOR schreibt jedes Jahr einen Preis von CHF 1000 aus, durch den herausragende Arbeiten auf dem Gebiet des Operations Research in Theorie oder Anwendung ausgezeichnet werden. Die eingereichten Arbeiten werden von einer durch den SVOR-Vorstand bestimmten Jury beurteilt. Der ausgesetzte Preis wird entweder einem einzelnen Preisträger zuerkannt oder unter mehreren Preisträgern aufgeteilt. Teilnahmeberechtigt sind alle an einer schweizerischen Universität oder Hochschule eingeschriebenen Studentinnen und Studenten. Als Wettbewerbsarbeiten werden nur Masterarbeiten anerkannt. Die folgenden Bedingungen müssen erfüllt sein:

- Die Arbeiten müssen zwischen dem 01.03.2020 und dem 28.02.2021 abgeschlossen worden sein.
- Die Arbeiten sind durch den betreuenden Universitäts- bzw. Hochschuldozenten zusammen mit einem kurzen Empfehlungsschreiben beim SVOR-Vorstand zuhänden der Jury einzureichen. Eine Zusammenfassung von maximal 3 Seiten ist beizulegen.
- Die Preisträger verpflichten sich, ihre Arbeit an einer SVOR Veranstaltung zu präsentieren.

Die Arbeiten sind bei der Geschäftsstelle office@svor.ch per E-Mail einzureichen bis spätestens **31.03.2021**.

Prix ASRO 2021 pour les travaux de Master

Chaque année, l'ASRO met au concours un prix de CHF 1000 qui récompense le meilleur travail, théorique ou appliqué, dans le domaine de la recherche opérationnelle. Les travaux seront jugés par un jury nommé par le comité de l'ASRO. Le prix pourra être décerné à un candidat unique ou attribué à plusieurs lauréats. Tous les étudiants et étudiantes inscrits dans une université ou une haute école suisse peuvent participer au concours. Seuls les travaux de Master peuvent être soumis à ce concours. Les conditions suivantes doivent être satisfaites :

- Les travaux doivent être achevés entre le 01.03.2020 et le 28.02.2021.
- Les travaux doivent être envoyés au comité de l'ASRO à l'attention du jury, accompagnés d'une brève lettre de recommandation du professeur responsable. Un résumé d'un maximum de 3 pages doit être inclus.
- Les lauréats s'engagent à présenter leur travail lors d'une réunion de l'ASRO.

Les travaux sont à adresser par email au bureau de l'ASRO office@asro.ch jusqu'au **31.03.2021**.

PhD Theses

New Approaches to Constrained Submodular Function Maximization

Simon Bruggmann

Supervisor: Prof. Dr. Rico Zenklusen (D-MATH, ETH Zurich)

Co-Supervisor: Prof. Dr. Justin Ward (Queen Mary University of London, London, UK)

Research Institute: Institute for Operations Research, ETH Zurich

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This thesis considers the constrained submodular function maximization problem (CSFMAX). The property of diminishing marginal returns, which is captured by submodular functions, is observed in numerous relevant maximization problems. CSFMAX problems therefore arise naturally in a wide variety of settings—from sensor placement to machine learning—and have attracted considerable interest during recent years. This thesis aims to contribute towards a better understanding of CSFMAX problems by looking at these problems from different viewpoints. The techniques we introduce lead to simplifications, generalizations, and improvements of existing results.

In the first part of this thesis, we consider relaxation and rounding approaches which became a standard and extremely versatile tool for CSFMAX. One of the most common rounding techniques in this context are contention resolution schemes. Such schemes round a fractional point by first rounding each coordinate independently, and then dropping some elements to reach a feasible set. Also, the step where elements are dropped is typically randomized. This leads to a second source of randomization within the procedure, which can complicate the analysis. We suggest a different, polyhedral viewpoint to design contention resolution schemes, which avoids to deal explicitly with the randomization in the second step. This is achieved by focusing on the marginals of a dropping procedure. Apart from avoiding one source of randomization, our viewpoint allows for employing polyhedral techniques. Both can significantly simplify the construction and analysis of contention resolution schemes.

We show how, through our framework, one can obtain an optimal monotone contention resolution scheme for bipartite matchings. So far, only very few results are known about optimality of contention resolution schemes. Our contention resolution scheme for the bipartite case also improves the lower bound on the correlation gap for bipartite matchings.

Furthermore, we derive a monotone contention resolution scheme for general matchings that significantly improves over the previously best one. At the same time, our scheme implies that the currently best lower bound on the correlation gap for general matchings is not tight by yielding a lower bound which is slightly higher.

Our results lead to improved approximation factors for various CSFMAX problems over a combination of matching constraints with further constraints.

Motivated by previous results showing interesting connections between linear and submodular maximization, we further investigate the relation between these two problems in the second part of this thesis. In linear programming, the ubiquitous simplex algorithm is based on the fact that

any local optimum with respect to the polyhedral neighborhood is also a global optimum. We show that a similar result carries over to submodular maximization. In particular, every local optimum of a monotone CSFMAX problem yields a $1/2$ -approximation, and we also present an appropriate extension to the non-monotone setting. However, reaching a local optimum quickly is a non-trivial task. Moreover, we describe a fast and very general local search procedure that applies to a wide range of constraint families, and unifies as well as extends previous methods. In our framework, we match known approximation guarantees while disentangling and simplifying previous approaches. Moreover, despite its generality, we are able to show that our local search procedure is slightly faster than previous specialized methods.

Furthermore, we resolve the open question whether a linear optimization oracle may be enough to obtain strong approximation algorithms for submodular maximization. We show that this is not the case by providing an example of a constraint family for which it is hard to get a good approximation for submodular maximization when using only polynomially many linear optimization oracle calls for the same constraints. From previous work, it follows that the hardness we prove is tight up to logarithmic factors.

Incremental Time Models and Reformulations of Integer Programs

Jörg Bader

Supervisor: Prof. Dr. Robert Weismantel (D-MATH, ETH Zurich)

Co-Supervisors: Prof. Dr. Alexander Martin (Friedrich-Alexander University Erlangen-Nürnberg, Germany), Dr. David Adjiashvili (D-MATH, ETH Zurich)

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In this dissertation, we discuss several topics in the context of mixed integer linear programming in variable dimension, both from a theoretical and a practical point of view. Lying in the intersection of Mathematics and Computer Science, this problem has rich theory and a wide variety of applications. However, many questions in integer linear programming are computationally intractable or known to be NP-hard. Much of the research in integer linear programming is driven by the goal of utilizing positive complexity results from fixed dimensional problems to related problems in variable dimension.

In the first part of the thesis, we study a reformulation of integer linear programs by means of mixed integer linear programs with fewer integer variables. Our reformulations capture the underlying algebraic and geometric structure of the problem. Our modeling decision is influenced by the ability to solve mixed integer linear programs efficiently when only few integer variables are present. This leads to mixed integer formulations that can express the set of feasible solutions more elegantly than solely linear inequality descriptions.

Many real-world problems that are modeled by integer linear programs have a combinatorial flavor where a feasible solution can be constructed by selecting elements from a given ground set. In the second part of the thesis, we study such classes of integer linear optimization problems under a time aspect. For some applications, resources to construct a final feasible solution are not available immediately, but the solution can only be constructed step by step in an incremental fashion. Our target is to find a feasible solution for the global optimization problem that is also reasonably good in the intermediate time steps. In order to get such solutions we construct objective functions that punish the violation of the constraints of the global problem in

intermediate steps. We show that many of the problems studied inherit the NP-hardness from the related global problem. On the other hand, polynomially solvable cases are identified.

Driven by the application of base station placement for drone supervision, in a third part of the thesis algorithms and complexity results for a geometric covering problem are studied. Techniques from different areas of mathematical optimization and theoretical computer science are combined to solve a new version of a well-known terrain guarding problem.

Optimization of Bimodular Integer Programs and Feasibility for Three-Modular Base Block IPS

Stephan Artmann

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(* Abstract on demand. *)

Master Theses

On Job-Insertion for the Blocking-Job-Shop and its Application to the SBB Challenge

Fabio Degiacomi

Supervisor: Dr. Reinhard Bürgy (University of Fribourg)

Research Institute: Decision Support & Operations Research Group, University of Fribourg

Industrial Partner: SBB, Bern, Switzerland

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The SBB challenge published on www.crowdai.org is a timetable generation problem, which can be interpreted as a blocking-job-shop (BJS) scheduling problem. In this problem, unlike in the classical job-shop, the N1 neighbors of a given solution are generally not feasible. Gröflin, Klinkert & Bürgy developed a method, conceptually based on the insertion of a single job (a SBB train) into a schedule, to recover the feasibility of N1 neighbors. In the present master thesis, different ways to improve the computational efficiency of that method are developed. Furthermore, the method is adopted to take the additional features of the SBB challenge into account. Numerical tests on standard BJS and SBB instances support the validity of the method. All resources, including the code, are available on <https://github.com/MrPascalCase/SbbChallenge>.

Entwicklung von Local Search Heuristiken zur Optimierung der Tourenplanung im Kehrrechtswesen von Gemeinden

Alain Kolp

Supervisor: Dr. Reinhard Bürgy (University of Fribourg)

Co-Supervisor: Vera Fischer (University of Fribourg)

Research Institute: Decision Support & Operations Research Group, University of Fribourg

Industrial Partner: Schwendimann AG, Münchenbuchsee

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Wir betrachten den Kehrichtsammelprozess in einer gegebenen Gemeinde. Wir können entscheiden, wo die Bürger ihren Abfall hinbringen sollen (Entscheide über Sammelpunkte) und welche Touren wir fahren, um den Abfall mit unseren Kehrichtsammelfahrzeugen einzusammeln. Die Sammelpunkte müssen so gewählt werden, dass sich in der Nähe jedes Haushalts mindestens ein Sammelpunkt befindet, wobei eine maximal zumutbare Gehdistanz als Input gegeben ist. Die Sammeltouren müssen so gestaltet werden, dass der gesamte Abfall abgeholt wird und die Sammelkapazität der Fahrzeuge nicht überschritten wird. Wir assoziieren Kosten mit den Anzahl Stopps der Fahrzeuge und der Gesamtdistanz der Sammeltouren. Ziel ist es, die Sammelpunkte und -touren so zu wählen, dass minimale Gesamtkosten entstehen. In dieser Masterarbeit wird ein rein kombinatorischer Local Search Algorithmus für das obige Optimierungsproblem entworfen, implementiert und an realen Inputdaten getestet. Im Vergleich mit mathematischen Programmieransätzen zeigt sich, dass der entwickelte Ansatz schnell ist, aber hinsichtlich Qualität der Lösungen noch Verbesserungspotential aufweist.

Testing the Robustness of the Multiple, Iterative Imputation Approach proposed by Kummer, Egger, Meusel, and Schmedders (2017)

Richard Abbasi

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Co-Supervisor: Vanessa Kummer (University of Zurich)

Research Institute: Chair of Quantitative Business Administration, University of Zurich

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In "Increasing the Value of Search Subscriptions for Housing Market Analyses" from Kummer, Egger, Meusel, and Schmedders (2017), unsupervised learning algorithms were used to complete a dataset consisting of housing search subscriptions to derive demand estimates. The researchers found that imputation and machine learning algorithms were effective tools in this pursuit. Compared to imputation where inferences are made based solely on complete observations, the authors used a method known as iterative imputation to decrease dependence on complete data, which can distort conclusions.

One goal of this thesis was to test the robustness of the aforementioned imputation process on a variety of simulated datasets with different attributes. Inspecting the imputation approach offered by Kummer et al. (2017) revealed weaknesses in the method's underlying process, but despite these weaknesses, the imputation approach provided robust estimates for missing values on simulated datasets. The best results provided estimates where variance from the actual values was 55% lower than the imputation variance found in benchmark methods.

The second goal of this thesis was to quantify the additional value of the iterative imputation process in terms of accuracy. The potential of iterative imputation to increase accuracy was evidenced after comparing iterative and non-iterative imputation processes; testing the related hypothesis resulted in p-values being lower than 0.001. The imputation method under examination can thus be an effective instrument in counteracting biased estimates stemming from overreliance on complete observations that do not represent the population as a whole.

Dynamic Debiasing of Natural Language Processing Models

Jakob Richi

Supervisor: Prof. Dr. Karl Schmedders (University of Zurich)

Co-Supervisor: Vanessa Kummer (University of Zurich)

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Natural language processing (NLP) models are important components of many artificial intelligence systems or other automated processes. Biased systems may lead to harmful consequences for affected individuals, demographics, or society in general. Bias embedded in society gets encoded into natural language and NLP models that are trained on this data may reflect these biases. While fairness is an emerging stream of research in machine learning and NLP, most bias mitigation methods require bias to be known and require manual efforts to alter the data or provide counterfactual examples.

Amini, Soleimany, Schwarting, Bhatia, and Rus (2019) propose a tunable unsupervised debiasing algorithm to mitigate bias. The method does not require the bias to be known and does not face a trade-off between model accuracy and bias mitigation. While the original paper applies the algorithm in a computer vision setting, the authors argue that the approach can be generalized to other domains. To complement bias mitigation methods in NLP, this research aims to evaluate the potential of the proposed debiasing algorithm in the NLP domain. We first replicate the experiments of the original paper including datasets and trained models and provide empirical validation of the original research. We find evidence for the existence of the debiasing effect, however our results are smaller in magnitude compared to the original research.

We then adapt the debiasing algorithm to text data and conduct experiments in a sentiment analysis task, to explore its potential for bias mitigation in NLP. While the results for models with applied debiasing show less bias on the bias benchmark datasets with respect to gender and race, few results show statistically significant differences to the baseline model without applied debiasing. Our results further suggest that existing overfitting issues for a particular class might be accentuated by the debiasing algorithm.

List of Master Theses from ENAC INTER TRANSP-OR, EPF Lausanne

Research Institute: ENAC INTER TRANSP-OR, EPF Lausanne

Contact: Prof Dr. Michel Bierlaire (EPF Lausanne), michel.bierlaire@epfl.ch

- **René Lugrin**, *Investigations on a pilot-survey for modelling mobility behaviours in Switzerland*
- **Adrien Nicolet**, *Risk assessment of pedestrian crossings*
- **Julien Harbulot**, *Transportation mode classification with smartphone accelerometer data: An end-to-end deep learning approach*
- **Sergej Gasparovich**, *Generating daily activity schedules using machine learning*
- **Alain Azzi**, *Feuille de route pour l'électrification du réseau de bus urbains de Lausanne à l'horizon 2030*

Upcoming Events

Due to the COVID-19 situation, organizational details of OR conferences are constantly being adapted. Please refer to the EURO calendar of events for up-to-date information:

www.euro-online.org/web/pages/460/calendar