ELAVIO 2016

May 9th – 13th, Cali – Colombia

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First of at all, I would like to thank to EURO and IFORS for giving me the opportunity of attending the ELAVIO 2016. This event has been very interesting and very useful for my career. I would like to present this inform describing the activities developed day by day.

MONDAY 9th:

Mini courses:

"Design and computational implementation of meta-heuristics" (Part 1) by Rodrigo Linfati :

This first part mini-course the lecturer explained the main meta-heuristics from an implementation point of view. The lecturer also explained the similarities between the metaheuristics and the changes required to re-use the code to test different meta-heuristics mainly based on local search.

"Metaheuristic applications in production and logistics" (Part 1) by Jose Luis Gonzalez Velarde:
Professor Jose Luis presented a shortly overview of meta-heuristics, and explained several papers for applications in production such as scheduling, line balancing, production cells among others. I found this part very useful given my background as industrial engineer.

"Optimization Methods for Data Visualization"(Part 1) by Emilio Carrizosa:
This mini-course was aimed at presenting the application of traditional methodologies to a new field, data science. The mini-course given by professor Carrizosa presented different optimization problems at the moment representing sets of information, professor Carrizosa also presented similarities between these kind of problems and traditional OR problems such as scheduling, TSP etc.

Student presentations attended:

- Applying Active Learning to Automatic Algorithm Selection
- Aproximación de soluciones a problemas combinatorios tipo mochila mediante un modelo probabilístico

Integration activity:

In the night of the first day the integration activity was a contest about collecting labels from five different countries. The winner received a small award. Then the participants get integrated and start to getting know each other.

TUESDAY 10th:

Mini courses:

"Design and computational implementation of meta-heuristics" (Part 2) by Rodrigo Linfati :
In this second part of the mini-course the lecturer presented hints and important points and developed "on live" demonstrations about the performance of the algorithms under different configurations. I found this course very useful for my knowledge.

"Metaheuristic applications in production and logistics" (Part 2) by Jose Luis Gonzalez Velarde:
In this second part of the course, Professor Jose Luis continued presenting relevant papers in production and logistics, this time the paper were focused on location, multi-commodity networks and the integration of heuristics and exact models.

"Optimization Methods for Data Visualization"(Part 2) by Emilio Carrizosa:
In this second part of the course professor Carrizosa continued the presentation of applications of OR methodologies to data visualization. This part also included an introductory talk about classification models.

Student presentations attended:

- Control de inventarios en logística humanitaria
- Diseño de un sistema de apoyo a la toma de decisiones - dss para la gestión de las etapas pre-desastre de sismos en Bucaramanga, basado en técnicas de aprendizaje automático (machine learning).
- Relief distribution network optimization for sudden onset disasters under a multi-criteria resilience framework
- Planejamento da expansão de sistemas de distribuição de energia elétrica
- The Multi-Depot VRP with driver interchanges

WEDNESDAY 11th:

Mini courses:

"Stochastic Modeling with Phase-type Distributions: Theory and Practice" (Parts 1 and 2) by Raha Akhavan Tabatabaei:
The first part of this mini-course was aimed at presenting the main properties of probability distributions. Then the phase-type distributions were introduced as an alternative to model empirical distributions. Professor Raha used several examples to explain the concepts and introduced the way to adapt phase-type distributions. In the second part of the tutorial professor Raha, presented multiple application of phase-type distributions such as vehicle routing problem, health care, construction industry and revenue management models in airlines. This mini-course was very interesting since the concept of phase-type is robust and allows to represent multiple empirical distributions but also use the Markovian properties of stochastic processes.

"Análisis de sensibilidad y programación paramétrica para problemas de programación lineal entera mixta " (Part 1) by Alejandro Crema:

In this tutorial professor Crema introduced the concept of average shadow price for mixed and integer linear programming models. Professor Crema also presented the properties and differences between dual variables and shadow price in this kind of models.

Student presentations attended:

- Design of the supply chain Pindo hat
- Diseño de un modelo de una cadena de abastecimiento de ciclo cerrado para una empresa manufacturera de la región
- Optimización del proceso dentro de las terminales de embarque de Gerona y Batabanó ante la adquisición de un ferry.
- Metodos hibridos para o problema de roteamento de vehiculos com janelas de tempo e multiplos entregadores
- Vehicle Routing Problem with Backhaul

THURSDAY 12TH:

Mini courses:

"Análisis de sensibilidad y programación paramétrica para problemas de programación lineal entera mixta " (Part 2) by Alejandro Crema:
In the second part of the tutorial, professor Crema was focused on extending the concepts of average shadow price no only by changes in the right hand side of the constraints but also in the coefficients of the objective function and left hand side of the constraints. The presentation of professor Crema was very theoretical but very interesting since the concepts presented allows to decision-makers develop a robust analysis on the solutions obtained from a MILP.

Student presentations attended:

- La simulación como herramienta de diseño de la terminal de cruceros en el puerto de La Habana
- Simulación basada en agentes para identificar y cuantificar los asentamientos informales de las personas desplazadas hacia el Municipio de Medellín
- Simulación del proceso físico-químico de ruptura y agregación en presencia de agitación externa mediante autómatas celulares
- Simulation-optimization model for production planning in the blood supply chain (Speaker)
- Enhancing Metaheuristics through Simulation to solve real-life problems under uncertainty. An application to the Single Depot Location Routing Problem with Stochastic Demands

Cultural Activity

The cultural activity was composed of two parts. Firstly, we were taken to the Universidad Javeriana where an activity based on dancing different types of dances of the region was developed. Then, two coaches called "Chivas" pick us up to do a tour by the most representative places of the city.

FRIDAY 12TH:

Lecture:

"Home Health Care Logistics Management: An Integrated Approach to Support Decisions with Hierarchical Interdependencies" by Valentina Gutierrez:

In this lecture professor Valentina presented an application of mixed and integer linear programming models to support strategic decisions in home healthcare. Firstly, the problems at different levels were introduced then a first model for staffing was presented followed for a districting problem. Finally the integration of both model was also presented. The presentation was very interesting since multiple problems of developing countries were considered and the methodological framework developed was very clear.

Mini courses:

"Facility Location Problems and Overview" (Parts 1 and 2) by Juan Guillermo Villegas:

In this mini-course, professor Villegas presented the different types of facility location problems as well as the main methodologies used to solve this kind of problems. In the second part of the tutorial multiple applications were presented including coffee supply chains, emergency systems, hospital waste management network among others.

Student presentations attended:

- Un algoritmo metaheurístico para la solución del problema de ruteo de vehículos con múltiples depósitos y flota heterogénea