Seminario de Doctorandos Rubio de Francia Conferencia

por

Aitor Hernández González

Universidad de Zaragoza

Título:

A short introduction to bilevel optimisation and its application to pricing problems

Resumen:

Bilevel opimisation allows modelling situations in which two levels of decision-makers are involved within a hierarchical framework. Each decision maker manages a subset of decision variables and aims to optimise their respective objective function subject to certain constraints. The lower level decision maker, or follower, knows the values assigned to the varibles controlled by the upper level decision maker, or leader, before optimising. On the other hand, the leader, having full knowledge about the follower's rational reactions, selects variable values to optimise their own objective function. Bilevel optimisation can be challenging due to the interrelationship between the leader and the follower. But, at the same time, this special structure can be used in so many real-world applications such as supply chain management, transportation planning, and pricing strategies.

The Rank Pricing Problem is a problem faced by a company that needs to determine the prices of a set of products offered to a set of customers in order to maximise the revenue and taking into account customer reaction and preferences. Every customer has a budget and is interested in a subset of products which are ranked by preference.Maybe, the customers are allowed to express indifference in terms of preference among products, leading to ties in customer preference lists. Once the prices have been set, each customer will purchase the cheapest product among those they can afford (if any) and satisfy them the most. The problem is formulated as a bilevel optimisation model. The main idea behind the procedure to solve the problem is to reformulate the bilevel model as a single level model exploiting the special structure of the second level problem.

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