



# Nicolas Zufferey

Geneva School of Economics and Management (GSEM)  
Université de Genève, Suisse/Switzerland



## TABU SEARCH WITH DIVERSITY CONTROL FOR AN INVENTORY MANAGEMENT PROBLEM WITH STOCHASTIC LEAD TIMES

**Abstract:** In most inventory management problems, two types of decision have to be made at the manufacturer level: when and how much to order to suppliers. It is assumed that setup, carrying and shortage costs are encountered during the planning horizon (typically a year). Usually, inventory management models are characterized by stochastic demand and constant lead times. In contrast, the presented problem (motivated by a real context) deals with the situation where there is a constant known demand rate, but probabilistic lead times. Even if the annual approximated costs can be analytically computed with a mathematical function  $f$ , simulation is the only way to compute the annual actual costs  $F$  of a solution. A solution  $(P, S)$  can be modeled by two vectors  $P$  (indicating when to order) and  $S$  (describing how much to order). For any relevant fixed number  $N$  of orders, the following three steps are performed. (1) Based on an EOQ analysis, generate an initial solution  $(P, S)$  with  $N$  orders as equi-spaced as possible. (2) Try to reduce  $f$  with a tabu search focusing on  $P$  (and adjusting  $S$  accordingly). (3) Try to reduce  $F$  with a descent local search working on  $S$  (without changing  $P$ ). In the extended version of tabu search, instead of only providing a single solution to step (3), it is suggested to provide a set of promising (according to quality and diversity) local optima.

**Note:** Nicolas Zufferey is a full professor of operations management at the University of Geneva in Switzerland. His research activities are focused on designing metaheuristics for difficult and large combinatorial optimization problems, with applications mainly in transportation, scheduling, production, inventory management, network design, and telecommunications. He is member of the CIRRELT transportation and logistics research center ([www.cirrelt.ca](http://www.cirrelt.ca)) and of the GERAD decision analysis research center ([www.gerad.ca](http://www.gerad.ca)). He received his BSc and MSc degrees in Mathematics at EPFL (the Swiss Federal Institute of Technology in Lausanne), as well as his PhD degree in operations research (2002). He was then successively a post-doctoral trainee at the University of Calgary (2003–2004) and an assistant professor at Laval University (2004–2007). He is the (co)author of more than 90 publications (papers in professional journals, proceedings of conferences, and book chapters) and has reviewed papers for 38 international journals. With 46 coauthors, he has had research activities with 19 Universities in Europe and North America, as well as with 15 private companies.

[N.Zufferey@unige.ch](mailto:N.Zufferey@unige.ch) / <http://www.unige.ch/gsem/iom/members1/professors/zufferey-nicolas/>

JEUDI / THURSDAY

3 août 2017 /  
August 3rd, 2017  
10h30

Salle / Room 5441  
Pavillon André-Aisenstadt  
Université de Montréal

Ouvert à tous / Open to all

Organisateur / Organizer  
Jean-Yves Potvin

