# FLORIAN DELAVERNHE
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## OPTIMAL SEARCH FOR A MISSING TARGET

**ZOOM :** https://hecmontreal.zoom.us/j/86711035313?pwd=NDJrYkZaTG1VUEVWMkdKQ3dpOXRmZz09
ID de réunion : 867 1103 5313 / Code secret : 854242

Abstract: This work addresses the optimization problem of managing the research efforts of a team of searchers in order to maximize the probability of detection of a target, represented by a non-linear objective function. In the present work, there are two new contributions. First, a novel formulation of the problem considering the traveling costs between the searched areas is proposed. It is more realistic and extends some previous problems addressed in the literature, however it is highly increasing the complexity of the problem. A greedy heuristic algorithm is devised and a lower bound based on a piecewise linear approximation of the objective function with a parametric error is proposed. Secondly, the present work extends the search allocation game variant of this problem. It is a game theory problem where the distribution of a search budget (player 1) is opposed to an evading target (player 2). We propose a new multi-objective formulation: seeking to produce a solution offering a long-term search and a short-term search. The proposed problem is a many-objective optimization problem with several objectives depending on the instance solved. We carefully study the differences and conflicts between these objectives to highlight the benefits of a multi-objectivization of this problem. With several objectives depending on the entry data, such a problem is too complex for a classical approach (epsilon-constraint) therefore we proposed a matheuristic approach based on the specificities of this problem. The solving methods proposed are experimented through this work.

Bio: Dr. Delavernhe has obtained his PhD from the University of Angers (France) in 2020, under the supervision of Pr. André Rossi and Pr. Marc Sevaux, with a short stay at the Massachusetts Institute of Technology (MIT) where he worked with Pr. Patrick Jaillet. Afterwards, Dr. Delavernhe has worked during a one year postdoc on a joint project between the University of Angers and HEC Montréal, with Pr. Jorge E. Mendoza. After the completion of his postdoc, Dr. Delavernhe became an associate professor at the University of Burgugndy as a member of the DRIVE laboratory where he joined the SIC (Systèmes Intelligents et Connectés) component. His research focuses on operations research and particularly on the modeling and solving of complex optimization problems. More precisely, his research curiosity is sparked by connected systems (e.g., UAVs or sensor networks) and on the target search problem.

## Jeudi / Thursday
8 septembre 2022, 10h30
September 8th, 2022, 10:30
**Date reportée / New date**

## Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal
et
Lien Zoom

## Ouvert à tous / Open to all

## Responsable / Organizer
## Jorge Mendoza