



**Séminaire conjoint / Joint Seminar**  
Chaire de recherche du Canada en logistique et en transport et  
Chaire de recherche du Canada en distributique

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## A HYBRID EVOLUTIONARY ALGORITHM FOR HETEROGENEOUS FLEET VEHICLE ROUTING PROBLEMS WITH TIME WINDOWS

**Abstract:** This paper presents a hybrid evolutionary algorithm (HEA) to solve heterogeneous fleet vehicle routing problems with time windows. There are two main types of such problems, namely the Fleet Size and Mix Vehicle Routing Problem with Time Windows (F) and the Heterogeneous Fixed Fleet Vehicle Routing Problem with Time Windows (H), where the latter, in contrast to the former, assumes a limited availability of vehicles. The main objective is to minimize the fixed vehicle cost and the distribution cost, where the latter can be defined with respect to en-route time (T) or distance (D). The proposed algorithm is able to solve the four variants of heterogeneous fleet routing problem, called FT, FD, HT and HD, where the last variant is new. The HEA successfully combines several metaheuristics and offers a number of new advanced efficient procedures tailored to handle the heterogeneous fleet dimension. Extensive computational experiments on benchmark instances have shown that the HEA is highly effective on FT, FD and HT. In particular, 149 of the 360 best known solution values for the three previously studied variants have been retrieved or improved within reasonable computational times. New benchmark results on HD are also presented.

**Note :** Çağrı Koç est étudiant de doctorat au département des sciences de la gestion à University of Southampton, sous la supervision de Tolga Bektaş. Il effectue présentement un stage au CIRRELT, sous la supervision de Ola Jabali and Gilbert Laporte. / Çağrı Koç is a Ph.D. student at the Department of Management Science of the University of Southampton. He is doing an internship at CIRRELT, under the supervision of Ola Jabali and Gilbert Laporte. [c.koc@soton.ac.uk](mailto:c.koc@soton.ac.uk)

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Salle / Room 5441  
Pavillon André-Aisenstadt  
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Ouvert à tous / Open to all

**Organisateur / Organizer**  
**Gilbert Laporte**



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