

A Container Assignment Problem with Pickup and Delivery

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1 Abstract

We address the problem of allocating containers into predefined positions of a carrier, in this case aircraft, under several realistic structural and safety constraints. The originality of our approach is to allow multi-trips with pickup and delivery at some intermediate locations. The objective is to minimize the economic and environmental costs including the impact of the intermediate operations. We resort to an integer linear model. Numerical experiments have been performed using a standard B&C library. Heuristics are developed to speed up the process.

Références

- [1] Limbourg, S., Schyns, M., and Laporte, G. (2011). Automatic Aircraft Cargo Load Planning. *Journal of the Operational Research Society*
- [2] William S. Swelbar (2010). The Future Economics of the Airline Industry, A Changing Vernacular. *MIT International Center for Air Transportation*.
- [3] Abdelghany, A. and Abdelghany, K. (2009). Modeling Applications in the Airline Industry. *Ashgate Publishing, Ltd.*
- [4] Bonnet C. (2009). Optimum CG position, What is the best CG position for an aircraft ? *Proceedings of the 16th Performance and Operations conference*, Paris.
- [5] Souffriau, W., Demeester, P. and Vanden Berghe, G. and De Causmaecker, P. (2008). The Aircraft Weight and Balance Problem. *Proceedings of ORBEL 22*, Brussels, pp. 44–45.
- [6] International Air Transport Association (IATA) (2004). Getting to grips with fuel economy (Airbus report).
- [7] Fok, K. and Chun A. (2004). Optimizing Air Cargo Load Planning and Analysis. *Proceedings of the International Conference on Computing, Communications and Control Technologies*, Austin, Texas, USA.
- [8] Mongeau, M. and Bès, C. (2003). Optimization of Aircraft Container Loading, *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 39, pp. 140–150.
- [9] Heidelberg, K.R., Parnell, G.S. and Ames, J.E. (1998). Automated Air Load Planning. *Naval Research Logistics*, Vol. 45, pp.751–768.
- [10] Ng, K.Y.K. (1992). A multicriteria optimization approach to aircraft loading. *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 39, pp. 140–150.