Bunker purchasing with contracts - DTU Orbit (14/12/2018)

Bunker purchasing with contracts

The cost for bunker fuel represents a major part of the daily running costs of liner shipping vessels. The vessels, sailing on a fixed roundtrip of ports, can lift bunker at these ports, having differing and fluctuating prices. The stock of bunker on a vessel is subject to a number of operational constraints such as capacity limits, reserve requirements and sulphur content. Contracts are often used for bunker purchasing, ensuring supply and often giving a discounted price. A contract can supply any vessel in a period and port, and is thus a shared resource between vessels, which must be distributed optimally to reduce overall costs. The Bunker Purchasing with Contracts Problem has been formulated as a mixed integer programme, which has been Dantzig-Wolfe decomposed. To solve it, a novel column generation algorithm has been developed. The algorithm has been run on a series of real-world instances with up to 500+ vessels and 500+ contracts, and provide near optimal solutions. This makes it possible for a major liner shipping company to plan bunker purchasing on a global level, and provides an efficient tool for assessing new contracts.

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