Heterogeneous resource scheduling and routing with order acceptance

Meryem İlbeĞİ*[1] and Eda Yucel[1]

[1]TOBB University of Economics and Technology [Ankara] – Turkey

Abstract

In this research, we study the resource scheduling and routing problem that is motivated by a service company that provides hourly machinery leasing services with and without machinery operators. Given a heterogeneous fleet of machinery, a set of operators with different machinery capabilities, and a set of work orders with their location and soft service time window information and their machinery type and operator requirements, the goal is to assign resources to the work orders in accordance with their competence and determine their routing, where a portion of the work orders might be rejected due to limited resources. The objective is to minimize total operational costs consisting of the traveling cost of the resources, overtime cost of the operators, and order latency and rejection costs. We develop a mixed integer programming formulation for the problem. As the computational effort grows rapidly with the problem size, a variable neighborhood search heuristic is proposed to provide solutions for realistic size instances. The performance of the proposed heuristic is analyzed through realistic problem instances obtained from the machinery leasing company that faces the problem on a daily basis.

Keywords: resource routing and scheduling, order acceptance, variable neighborhood search

*Speaker