

A Coordinated Scheduling of SP-AS/RS and Handling Equipment at Automated Container Terminals

Seyed Hamidreza Sadeghian
Islamic Azad University-Lenjan Branch
Sadeghian@iauln.ac.ir

Abstract

Increasing demand for containerization and large container ships in service, compel container terminals to improve their performance. In Automated Container Terminals (ACTs), containers are unloaded from (loaded to) the vessels, by using Automated Quay Cranes (AQC)s. Commonly, containers are stacked in storage yards before they delivered to final customers, or to the arriving vessels. Moreover, automated vehicles are used to connect the AQC)s to the storage yard. In order to increase land utilization and lower times for the storage and retrieval operations, a new storage system called Split-Platform Automated Storage/Retrieval System (SP-AS/RS) has been introduced. In this system, containers are stored in racks, and two platforms are used to transfer them horizontally and vertically. In this paper, a novel integrated scheduling model is developed to optimize the scheduling of handling equipment including ALV, AQC)s and SP-AS/RS at automated container terminals with unlimited buffer spaces. To evaluate the performance of the developed model, numerical experiments are designed and the obtained results are reported and analyzed in this paper. As the computation time and ease of application are so important for real practices of the scheduling methods, so a meta-heuristic algorithm based on Genetic Algorithm is developed.

References

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