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Autonomous Truck Routing and Platooning considering with Cargo Transshipment

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Abstract. With rapid development of global trade, direct freight transportation is insufficient in the present supply chain operation. Transshipment is a means of transport where goods are delivered to a transfer station from the origin and then to a further destination. In transfer stations, small shipments can be consolidated to form a larger shipment to increase the overall efficiency of transportation. Moreover, thanks to the advanced technology of autonomous driving, autonomous trucks (ATs) can form platoons featured with short inter-truck distance on the highway, which saves fuel consumption because of the air drag reduction. This study formulates a time-space network model for autonomous truck routing and platooning considering with cargo transshipment aiming to minimize the operation cost of a fleet in a road network. We develop a large-neighborhood-search-based heuristic algorithm integrating a tempo-special clustering method to obtain near-optimal solutions for large-scale problems. Based on a grid and a real-world highway network, extensive numerical experiments are conducted to evaluate the proposed method.

Keywords: Autonomous truck; Truck platooning; Cargo transshipment; Time-space network

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