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Courier Collaboration in Pickup and Delivery Services by Hub Transshipment across Flexible Time Periods

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Abstract

Most research work on pickup and delivery routing problems is concerned with developing solution algorithms. However, when the service area is large and job density is low, couriers frequently travel a long distance to serve a few customers. Service inefficiency can be attributed to inherent lacking of economies of scale and reflects on tough tradeoffs between courier utilization and customer waiting time. In this paper, operational policy design of courier services is addressed aiming at reducing both workload and waiting time. Regression metamodels of tour length are first constructed by simulation. Mean-value performance analysis of a new policy of hub transshipment across flexible time periods contrast to the periodical routing policy is next presented. Applicability condition of the new policy is provided. Finally, dynamic operation of the policy is illustrated with styled data of courier service at a large hospital.

Keywords: Pickup and delivery routing, transshipment, flexible time period, collaborative services, multiple objectives.