

An Optimal Designing and Routing Issue For A Hub Network Under Nonrestrictive Policy

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Abstract

In recent decades hub networks have been increasingly adapted for various flow management systems including communication networks, airline passenger flow networks, parcel delivery networks, and logistics networks. In such a hub network, traffic is transmitted directly to its hubs, so that traffic flow between each pair of hubs increases greatly in quantity. This provides a motivation to study on optimal hub network design. Thereupon, this paper considers a hub network design problem where the network service area partitioned into the predetermined zones is given, and non-stop service is allowed. The objective is to design a hub network under nonrestrictive networking policy by determining all the required hub locations in the predetermined zones and also all the terminal-to-terminal routes such that the total network cost is minimized. The network cost considers the hub opening cost, link opening cost, and flow transportation cost. In the analysis, the proposed problem is expressed as a integer programming, for which a dual-based solution approach is proposed.