

P-Hub approach for the optimal park-and-ride facility location problem

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Abstract

Park and Ride facilities (P&R;) are car parks at which users can transfer to public transportation to reach their final destination. We propose a mixed linear programming formulation to determine the location of a fixed number of P&R; facilities so that their usage is maximized. The facilities are modeled as hubs. Commuters can use one of the P&R; facilities or choose to travel by car to their destinations, and their behavior follows a logit model. We apply a p-hub approach considering that users incur in a known generalized cost of using each P&R; facility as input for the logit model. For small instances of the problem, we propose a novel linearization of the logit model, which allows transforming the binary nonlinear programming problem into a mixed linear programming formulation. A modification of the Heuristic Concentration Integer (HCI) procedure is applied to solve larger instances of the problem. Numerical experiments are performed, including a case in Queens, NY. Further research is proposed..

Keywords

Location, Park and Ride, p-Hub, Logit model, Heuristic concentration integer.