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Comparison of Different Toll Policies in the Dynamic Second-best Optimal Toll Design Problem: Case study on a Three-link network

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Abstract

In this paper, the dynamic optimal toll design problem is considered as a one leader-many followers hierarchical non-cooperative game. On a given network the road authority as the leader tolls some links in order to reach its objective, while travelers as followers minimize their perceived travel costs. So far toll has always been considered either as constant or as time-varying. Inspired by the San Diego's Interstate 15 congestion pricing project, in which heuristics with toll proportional to traffic flow are applied on a real two-link highway network, we consider toll as proportional to traffic flows in the network. On a three-link network we investigate various toll schemes and their influence on the outcome of the game for the road authority.
We show that the use of alternative toll schemes may improve system performance remarkably.