On a Traffic Assignment Problem with Elastic Balanced Demand

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We study a traffic assignment problem with elastic balanced demand. This problem appeared from the idea to design a cloud service for interactive traffic modeling in a developing urban infrastructure. We formulate this problem as a variation inequality with a non-potential mapping and a feasible set which is determined as balance constraints for the total number of trips originating and terminating in different zones. It is shown that the solutions of the studied problem are Wardrop equilibrium flows in terms of well-defined generalized route travel costs. We establish the uniqueness of the generalized equilibrium travel cost as well as the invariance of the set of shortest routes on the solution set of the studied problem. We propose the economical interpretation of dual multipliers for the balance constraints from the urban infrastructure extension point of view. We suggest an approach to the solution of the problem and conduct computational experiments on a real transportation network.

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