Inexact restoration method to solve the demand adjustment problem

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The problem of estimating the origin-destination matrix (DAP: demand adjustment problem) in a congested transport network, can be dealt as a Mathematical Program with Equilibrium Constraints (MPEC), where the equilibrium constraint is precisely, the user's deterministic equilibrium formulated by Wardrop (DUE: deterministic user equilibrium). Under certain assumptions over the net it can be proved that equilibrium solutions coincide with the solutions of a convex optimization problem (TAP: traffic assignment problem). Consequently, DAP can be rewritten as a bilevel optimization problem.

An inexact restoration method for nonlinear bilevel problems is studied. The objective is to adapt it in order to test its performance over DAP. In its original version and under certain hypothesis convergence of the method is proved in [1].

So far, we have studied and proposed in [4], heuristics that deal with the reformulation of DAP as a single level problem. In contrast, the proposal of this work is interesting as it takes in to account and profits from the structure of the problem of the lower level, the TAP. The original motivation for studying this method is associated with this last observation, as there exist plenty of algorithms with very acceptable performance that solve TAP and that can be used in an implementation of the inexact restoration method to solve DAP. More precisely, the algorithms implemented in [2] will be used to solve the assignments in the restoration phase and for the optimization phase a minimization procedure inspired in the work of Martinez [3] will be used.

Numerical results will be presented.

Referencias

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