

Standard Embedding for Linear Complementarity Problems

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Abstract: We propose a modified standard embedding for solving the linear complementarity problem (LCP). This embedding is a special one-parametric optimization problem $P(t), t \in [0, 1]$. Under the conditions (A3) (the Mangasarian–Fromovitz Constraint Qualification is satisfied for the feasible set $M(t)$ depending on the parameter t), (A4) ($P(t)$ is Jongen–Jonker–Tiwilt regular) and two technical assumptions, (A1) and (A2), there exists a path in the set of stationary points connecting the chosen starting point for $P(0)$ with a certain point for $P(1)$ and this point is a solution for the (LCP). This path may include types of singularities, namely points of Type 2 and Type 3 in the class of Jongen–Jonker–Tiwilt for $t \in [0, 1)$. We can follow this path by using pathfollowing procedures (included in the program package PAFO). In case that the condition (A3) is not satisfied, also points of Type 4 and 5 may appear. The assumption (A4) will be justified by a perturbation theorem. Illustrative examples are presented.

Keywords: linear complementarity problem; standard embedding; Jongen–Jonker–Tiwilt regularity; Mangasarian–Fromovitz constraint qualification; pathfollowing methods;

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