

## Algorithms for linear complementarity problems

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The Linear Complementarity Problem (LCP) consists of finding two nonnegative vectors satisfying linear constraints and complementarity conditions between pairs of components of the same order. In some applications, variables of one of the vectors may be unrestricted in sign while the corresponding variables of the other vector are equal to zero, leading to the so-called Mixed Linear Complementarity Problem (MLCP).

The LCP and the MLCP find many interesting applications in several areas of science, engineering, finance and economics. Furthermore Linear Programs, the computation of Stationary Points of Quadratic Programs and the solution of Affine Variational Inequalities reduce to one of these two linear complementarity problems.

In this talk the most efficient algorithms for the solution of the two linear complementarity problems are surveyed. Active-set methods are very useful for solving LCP and MLCP associated to quadratic programs and reduce to the famous simplex method when the objective function is linear and basic feasible solutions of the feasible set are employed.

Lemke's Pivoting, Interior-Point and Newton Semi-Smooth algorithms are very efficient to solve the LCP and can be extended to deal with the MLCP. However, they can only be applied to problems satisfying monotonicity or a similar hypothesis. In general an enumerative method is required to solve the LCP (or MLCP) or to show that this problem has no solution. Some comments about the benefits and drawbacks of all these algorithms in practice are also presented in this talk.

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