Classes of Matrices and Their Applications to LCPs

The linear complementarity problem (LCP) refers to a particular optimization problem. It consists in finding a vector in a finite-dimensional real vector space that satisfies a certain system of inequalities. We present results pertaining to the existence and multiplicity of solutions to the linear complementarity problem with the help of a few matrix classes. This refers to the analytic approach, in which one relies on an equivalent formulation of the LCP as a certain familiar mathematical programming problem (such as a quadratic program or a fixed-point problem) and then invokes an existence theorem (which is presumably proven by other means) for the latter problem. We discuss some matrix classes, the relations existing among them and a few important results that help in knowing the existence and multiplicity of the solutions of the LCP.