

**"Mathematical Programs with Equilibrium Constraints:
Automatic Reformulation and Solution via Constrained Optimization"**

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Constrained optimization has been used extensively to solve many large scale deterministic problems in economics. These models include square systems of equations, along with nonlinear programming models designed to optimize a particular measure of economic good. More recently, complementarity formulations have been developed to model various phenomenon, particularly for general equilibria. Finally, the unifying framework of mathematical programs with equilibrium constraints (MPEC) has been given a solid theoretical base. This paper briefly reviews some methods available to solve these problems and describes a new suite of tools for working with MPEC models. Using these tools, a variety of different nonlinear programming reformulations of MPEC problems are described and constructed. We assume that the equilibrium constraints are formulated as a mixed complementarity problem, and completely described by a matching between a function and a variable, along with the variable's bounds. Computational results demonstrating the potential of this tool are given in a variety of applications areas.