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17. Control Theory and Optimization

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To Solving of Equilibrium Programming Problems

This talk will deal with the problem to compute a fixed point $v^* \in \Omega^*$ of the extreme constrained map

$$v^* \in \operatorname{Argmin}\{\Phi(v^*, w) \mid \quad g(w) \leq 0, \; w \in \Omega\}, \tag{1}$$

where $\Phi: \; R^n \times R^n \to R, \; \Omega \subseteq R^n$ is a convex closed set, $\Phi(v, w)$ is a convex function in $w \in \Omega$ for every $v \in \Omega$, $\Omega^* \subseteq \Omega$. It is supposed that the extreme map is defined for all $v \in \Omega$ and the solution set Ω^* of (1) is nonempty.

Problem (1) contains as a special cases of noncooperative games with Nash equilibria, inverse optimization problems, economic equilibrium problems and others.

To solve problem (1) it is offered a splitting-approach such that considered problem can be reduced to solving jointly of convex and saddle programming problems.