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On quasiconvex mathematical programming problems with equilibrium constraints

A mathematical programming problem with equilibrium constraints (MPEC) is a constrained optimization problem with equality and inequality constraints and, additionally, some equilibrium constraints:

$$\text{(MPEC)} \qquad \min f(z)$$
$$\text{s.t.} \quad \begin{cases} g(z) \leq 0, \\ h(z) = 0, \\ G(z) \geq 0, H(z) \geq 0, \\ \langle G(z), H(z) \rangle = 0 \end{cases}$$

In general the constraint region associated to this problem is neither compact nor convex, even if the constraint functions are supposed to be linear. Nevertheless under the weak assumption that g is quasiconvex and h, H and G are quasiaffine, the constraint set appears to be *locally starshaped*.

The locally starshapedness is a rich structure and we will first present some existence results, necessary and sufficient optimality conditions for the problem of minimizing a quasiconvex function over a locally starshaped set.

Corresponding results for quasiconvex MPECs will be obtained as particular cases.

References

[1] D. Aussel and J. Ye, *Quasiconvex programming with locally starshaped constraint region and applications to quasiconvex MPEC*. Optimization, to appear.

[2] D. Aussel and N. Hadjisavvas, *Adjusted sublevel sets, normal operator and quasiconvex programming*. SIAM J. Optim., to appear.