Recent results in Asysmptotic Analysis with Applications in Optimization Theory

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Abstract

We present some recent results on Asymptotic analysis with applications to Continuous Optimization. After a short exposition of the classical results regarding recession cones and asymptotic functions in the convex case, as well as more recent extensions to more general settings, e.g. quasiconvex functions, we focus on three recent developments:

1) Applications of the q-asymptotic function to optimization and equilibrium problems in Banach spaces, establishing results on non-emptiness and compactness of the solution set.

2) Applications of the classical asymptotic function to Mixed Variational Inequality Problems in finite dimensional spaces, obtaining results of the same kind.

3) Introduction of a new second order asymptotic function, which provides information on the convexity (concavity) of the original function at infinity.

These results have been proved in [1], [2], [3] and [4], coauthored by Felipe Lara Obreque.

References

[1] IUSEM, A., LARA, F. Second order asympotic functions and applications to quadratic programming. *Journal of Convex Analysis* **25** (2018) 271-291.

[2] IUSEM, A.N., LARA, F. Existence results for noncoercive mixed variational inequalities. *Journal of Optimization Theory and Applications* **183** (2019) 122-138.

[3] IUSEM, A.N., LARA, F. Optimality conditions for equilibrium problems and vector optimization. *Journal of Optimization Theory and Applications* **180** (2019) 187-206.

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[4] IUSEM, A.N., LARA, F. Quasiconvex optimization problems and asymptotic analysis in Banach spaces (to be published in *Optimization*).