

Improved sequential optimality conditions for convex optimization problems with cone-epi-closed functions

ANCA GRAD

ABSTRACT.

Sequential optimality conditions are particularly interesting in optimization due to the fact that they do not require the fulfillment of any other constraint qualification, which is the case when working with other types of optimality conditions. In this article we improve some previously published results for quite a general class of convex optimization problems, where the functions considered are cone-convex and cone-epi-closed, and then provide new sequential optimality conditions for convex composed optimization problems. They could be further used to deduce sequential characterizations for general classes of vector optimization problems.

REFERENCES

- [1] Boţ, R. I., Csetnek, E. R. and Wanka, G., *Sequential Optimality Conditions in Convex Programming via Perturbation Approach*, Journal of Convex Analysis 15(1), 149-164, 2008
- [2] Boţ, R. I., Csetnek, E. R. and Wanka, G., *Sequential Optimality Conditions for Composed Convex Optimization Problems*, Journal of Mathematical Analysis and Applications 342 (2), 1015-1025, 2008
- [3] Boţ, R. I., Grad, A. and Wanka, G., *Sequential Characterization of Some Efficient Solutions in Vector Optimization*, Preprint 22, Faculty of Mathematics, Chemnitz University of Technology, Germany, 2007
- [4] Grad, A., *Optimality Conditions with Sequences in Basic Vector Optimization*, Topics in Mathematics, Computer Science and Philosophy, A Festschrift for Wolfgang W. Breckenr, Presa Universitară Clujeană, 124-136, 2008
- [5] Jahn, J., *Vector Optimization - Theory, Applications, and Extensions*, Springer, Berlin Heidelberg New York, 2004
- [6] Jeyakumar, V. and Wu, Z. Y., *A Qualification Free Sequential Pshenichnyi - Rockafellar Lemma and Convex Semidefinite Programming*, Journal of Convex Analysis 13(3-4), 773 - 784, 2006
- [7] Luc, D. T., (1989) *Theory of Vector Optimization*, Lecture Notes in Economics and Mathematical Systems, Vol. 319, Springer, Berlin Heidelberg New York
- [8] Penot, J. P. and Théra, M., *Semi-Continuous Mappings in General Topology*, Archiv der Mathematik 38, 158-166, 1982
- [9] Rockafellar, R. T., *Convex Analysis*, Princeton University Press, Princeton, 1970
- [10] Sawaragi, Y., Nakayama, H. and Tanino, T., *Theory of Multiobjective Optimization*, Mathematics in Science and Engineering, Vol. 176, Academic Press, Orlando, 1985
- [11] Thibault, L., *Sequential convex subdifferential calculus and sequential Lagrange multipliers*, SIAM Journal on Control and Optimization 35(4), 1434-1444, 1997
- [12] Zălinescu, C., *Convex Analysis in General Vector Spaces*, World Scientific, Singapore, 2002

BABEŞ BOLYAI UNIVERSITY
CHAIR OF ANALYSIS AND OPTIMIZATION
KOGĂLNICEANU STR NO 1
400084 CLUJ-NAPOCA, ROMANIA
E-mail address: dimitruanca@math.ubbcluj.ro

Received: 28.03.2008; In revised form: 17.02.2009.; Accepted:
2000 *Mathematics Subject Classification*. 90C25, 90C29, 90C46, 49K99.
Key words and phrases. *Convex optimization, scalarization, sequential optimality conditions.*
This paper was partially supported by the CEEX grant CanScreen nr. 125/2006.