About closedness type regularity conditions in convex optimization

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The closedness type regularity conditions have proven during the last decade to be viable alternatives to their more restrictive interiority type counterparts, in both convex optimization and different areas where it was successfully applied, from which we mention only variational inequalities and the theory of monotone operators.

In this talk we will de- and reconstruct some general closedness type regularity conditions, in order to stress that they arise naturally when dealing with optimization problems, as noticed earlier by Precupanu.

To this end, we characterize first (stable) ε-duality for general optimization problems formulated by means of perturbation functions by making use of epigraphs of the conjugates and (convex) subdifferentials of the involved functions.

These results are used in order to de- and reconstruct recent closedness type regularity conditions from the literature that guarantee (stable) zero duality gap and (stable) strong duality in convex optimization, respectively.

The general results are then particularized for constrained and unconstrained optimization problems as well as for composed convex optimization problems and different results of the author and his coauthors or due to Bo\c{t} and Wanka, and Burachik, Jeyakumar and Wu, respectively, are rediscovered as special cases.