

# From exhaustive families of lower concave approximations to the Demyanov-Rubinov subdifferentials

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## Abstract

The purpose of this talk is to introduce for real-valued nonsmooth functions new notions of subdifferentiability, called the Demyanov-Rubinov subdifferential (the *DR*-subdifferential) and the Demyanov-Rubinov superdifferential (the *DR*-superdifferential). These notions are essentially based on the results by Demyanov and Rubinov and their following (see [1, 2, 3] and reference therein) devoted to upper convex and lower concave approximations and exhausters. For convex functions the *DR*-subdifferential coincides with the classical subdifferential in the sense of the convex analysis while for nonconvex functions the *DR*-subdifferential generalizes the Fréchet subdifferential (the latter belongs to the *DR*-subdifferential as a (possibly empty) subset). In comparison with the Fréchet subdifferential, the *DR*-subdifferential is nontrivial for much broader class of functions. As applications necessary as well as sufficient conditions for a local minimum of real-valued nonsmooth functions which are formulated in the terms of the *DR*-subdifferentials and the *DR*-superdifferentials are established.

## References

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