GENERALIZED SECOND-ORDER SUFFICIENT OPTIMALITY CONDITIONS

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The generalized second-order sufficient conditions of unconstrained minimization problem will be presented for $C^{1,1}$ functions (i.e. Gâteaux differentiable functions with locally Lipschitz gradient – this class of functions appears in, e.g. penalty function method and proximal point method) above all.

We used a certain generalized second-order directional derivative for locally Lipschitz functions, which become a second-order lower Dini directional derivative for continuously Gâteaux differentiable functions.

We will show by establishing relationships among some second-order derivatives that the presented second-order sufficient condition for $C^{1,1}$ functions is tighter than the previous (given by R. Cominetti and R. Correa, W. L. Chan, L. R. Huang and K. F. Ng). This fact will be demonstrated by a numerical example in which the mentioned conditions may not be applicable.

Finally, we will present the generalized second-order sufficient condition for arbitrary locally Lipschitz functions and we will apply this result on minimization problem with convex functionals.