

**Mifflin, Robert**

**Semismooth and semiconvex functions in constrained optimization.** (English) Zbl 0376.90081  
*SIAM J. Control Optim.* 15, 959-972 (1977).

See also the booklet of the author with the same title [RR-76-21. Laxenburg, Austria (1976; [Zbl 0364.90091](#))].

This paper introduces semismooth and semiconvex functions and discusses their properties with respect to nonsmooth nonconvex constrained optimization problems. These functions are locally Lipschitz, and hence have generalized gradients. In a recent paper [Math. Oper. Res. 2, 191–207 (1977; [Zbl 0395.90069](#))] the author has given an optimization algorithm that uses generalized gradients of the problem functions and converges to stationary points if the functions are semismooth. If the functions are semiconvex and a constraint qualification is satisfied, then we show that a stationary point is an optimal point. The paper also shows that the pointwise maximum or minimum over a compact family of continuously differentiable functions is a semismooth function and that the pointwise maximum over a compact family of semiconvex functions is a semiconvex function. Furthermore, it is shown that a semismooth composition of semismooth functions is semismooth and a type of chain rule for generalized gradients is given.

Reviewer: [Robert Mifflin](#)

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**MSC:**

[90C26](#) Nonconvex programming, global optimization  
[90C30](#) Nonlinear programming  
[49J52](#) Nonsmooth analysis

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