Mladineo, Regina Hunter

**An algorithm for finding the global maximum of a multimodal, multivariate function.** (English) Zbl 0598.90075

Math. Program. 34, 188-200 (1986).

A method is presented for finding the global maximum of a Lipschitzian function f(x) (with Lipschitz constant K) over a cube $A_i \leq x^i \leq B_i$, $i = 1, 2, ..., N$ in $R^N$ ($x^i$ is the i-th coordinate of x). Like a number of previously known methods, this one constructs a sequence of points $x_0$, $x_1, ..., x_n, ...$, starting from an arbitrary point $x^0$ in the cube, such that $x_{n+1}$ is a global maximizer of $F_n(x) = \min\{Kx - x_j| + f(x_j) : j = 0, 1, ..., n\}$ over the cube (it is proved in the paper that any cluster point of such a sequence is a global maximizer of f, though the fact has been known previously). The main difficulty with this approach is how to find a global maximizer of a function of the form $F(x) = \min\{K|x - x_j| + h_i : i = 0, 1, ..., m\}$. Starting from the observation that the graph of F is the intersection of a number of conical surfaces, the author establishes that any point of the graph which corresponds to a relative maximum must be a solution to a system of N linear equations (in $N + 1$ variables $x^1, ..., x^N, z$) and a quadratic equation. She then proposes to compute the solutions of all such systems of equations in order to chose the global maximizer.

The algorithm seems to be efficient only for N very small. Actually, the computational experience is reported only for functions of two variables.

Reviewer: H.Tuy

**MSC:**

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|---|---|---|
| 90C30 | Nonlinear programming | Cited in **2** Reviews |
| 65K05 | Numerical mathematical programming methods | Cited in **40** Documents |

**Keywords:**

Lipschitzian function; global maximizer; conical surfaces

**Full Text:** DOI

**References:**

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