New DIRECT-type algorithms for global optimization problems

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In this talk we propose new deterministic methods for global optimization. All these methods draw their inspiration from the DIRECT-algorithm. In fact their approach is to partition the feasible set into a growing number of hyperintervals, to evaluate the objective function on the center of every hyperintervals and, at each iteration, to select the *most promising* hyperintervals to be further partitioned.

All these methods have the common feature of using the same partitioning technique of the DIRECT algorithm. This partitioning technique produces at most $2n$ new hyperintervals and, hence, it is not much expensive. Nevertheless it is able to adapt itself to the particular selection rule used. In fact, a less restrictive selection rules leads to a more uniform partition of the feasible set, while a more restrictive one leads the algorithm to generate points clustered in particular regions of the feasible set.

The new algorithms try to improve the efficiency of the previous versions of the DIRECT algorithm by following and, possibly, combining the following ideas:

- to select the *promising* hyperintervals by using new criteria able to exploit further information on the objective function, if available;

- to incorporate the use of suitable local minimizations starting from *the most promising* points among those generated by the DIRECT-type algorithm.

Numerical results are reported which show the interest of the proposed algorithms.

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