Optimization Techniques

Laboratory 2

DIRECT, Basin-hopping

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DIviding REctangles (DIRECT) algorithm

Highly applicable partitioning algorithm

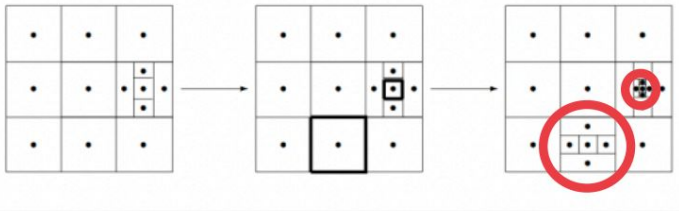
1. **Select** potentially optimal rectangles
2. **Sample** the function inside the rectangle
3. **Divide** into thirds based on the function evaluations

Pros:

- No gradient computation, finds global optimum's basin quick

Cons:

- Sensitive to curse of dimensionality
- Slow the end of the search



The cube in the center of the far right rectangle is potentially optimal and is divided. In this case, the central cube on the bottom row, which has a side length that is greater than or equal to the side length of all other rectangles, is also potentially optimal and is therefore divided.

Basin hopping

Iterative local search with different starting points

1. **Hop** to new regions of the search space to locate good basins
2. Perform **local search**
3. **Accept/reject** the new solution

Works well when many well-separated optimums are present