MISO: Mixed-Integer Surrogate Optimization of Blackbox Problems

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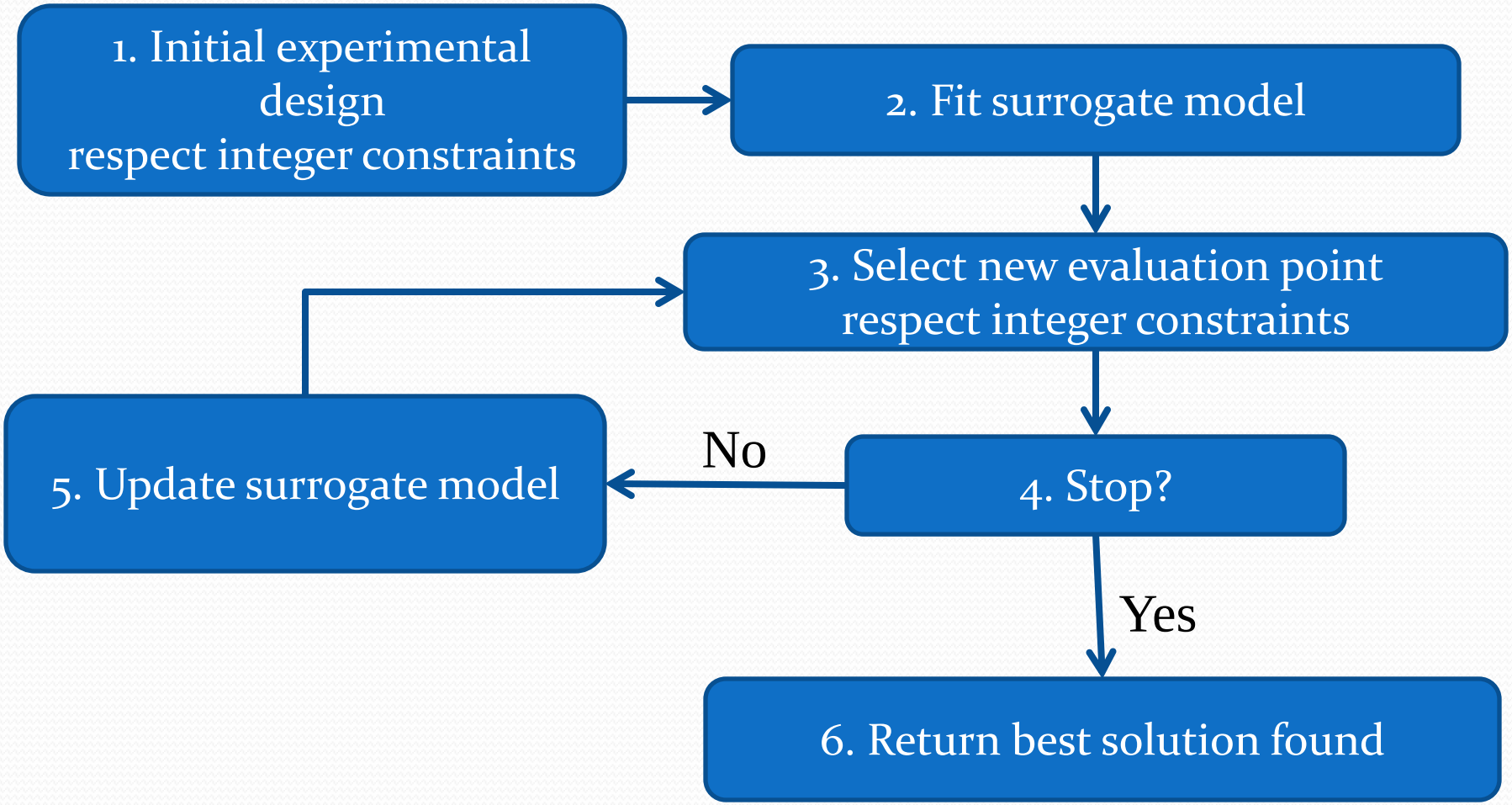
- We consider optimization problems of the following type:

$$\min_{x \in D} f(x)$$

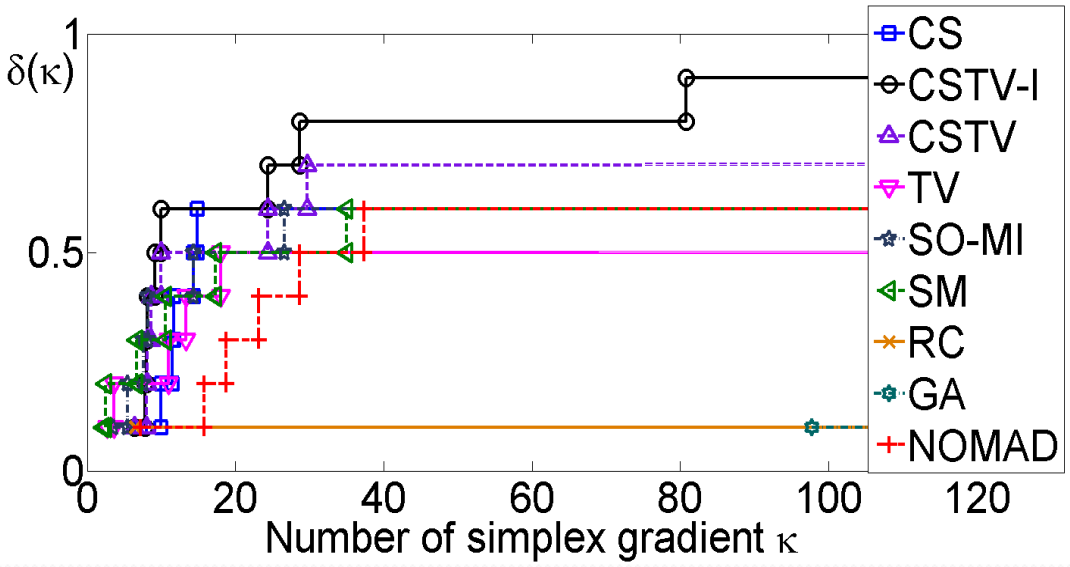
where D is a box-constrained variable domain

- The optimization problem has the following characteristics
  - Mixed-integer: $D \subset Z^{k_1} \times R^{k_2}$
  - $f(x)$ is a blackbox simulation model
  - Derivatives of $f(x)$ are not available
  - $f(x)$ is computationally expensive
  - $f(x)$ is not defined if integer variables are relaxed

MISO Framework



Numerical Experiments with MISO and Alternative Algorithms



- SO-MI: Surrogate Optimization –Mixed Integer
- GA: Genetic algorithm
- NOMAD: Nonlinear Optimization by Mesh Adaptive Direct Search

MISO algorithms:

- CS: coordinate search
- TV: target value strategy
- SM: Surface minimum sampling
- RC: Random candidate point sampling
- CSTV-l: coordinate search combined with target value strategy and local search
- CSTV: coordinate search combined with target value strategy