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

1. Initial experimental design
   respect integer constraints

2. Fit surrogate model

3. Select new evaluation point
   respect integer constraints

4. Stop?
   - Yes: 6. Return best solution found
   - No: 5. Update surrogate model

5. Update surrogate model

6. Return best solution found
Numerical Experiments with MISO and Alternative Algorithms

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

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