

## Algorithm design for mixed-integer black-box optimization problems with uncertainty

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## Stellingen

Behorende bij het proefschrift

## Algorithm Design for Mixed-Integer Black-Box Optimization Problems with Uncertainty

- 1. The art of optimization is a universal key that unlocks potential in a wide range of applications, transforming challenges into opportunities across disciplines.
- 2. The mathematical definition of a real-world problem is a fundamental prerequisite for the application of an optimization algorithm to this problem. *Chapter 3*.
- 3. Exploratory Landscape Analysis can be employed to quantify the similarity between optimization problems, thus allowing the identification of surrogate problems that closely mirror the complexity of real-world optimization problem landscapes. *Chapter 4.*
- 4. Tuning an optimization algorithm on surrogate optimization problems is an effective and efficient method to find specific parameter configurations for a computationally expensive real-world optimization problem. *Chapter 4.*
- 5. The performance of an optimization algorithm in solving a discretized continuous optimization problem depends on the level of discretization. *Chapter 5.*
- 6. Dynamic budget allocation methodologies that integrate uncertainty quantification can lead to more efficient use of computational resources. *Chapter 6.*
- 7. In practice, optimization is a perpetual endeavor, as there is always potential for improvement.
- 8. The effectiveness of learning systems is limited by the quality of the input data.
- 9. The objective determines the optimal solution.
- 10. The use of ever more sophisticated simulations and more complex algorithms leads to a growing demand for and consumption of resources.

André Thomaser Leiden, 22 October 2024