Model-assisted robust optimization for continuous black-box problems

Ullah, S.

Propositions
accompanying the thesis

Model-Assisted Robust Optimization for Continuous Black-Box Problems

Sibghat Ullah

1. Kriging, polynomials, and support-vector machines are excellent modeling techniques in the context of robust optimization. *Chapter 3.*

2. PCA and Autoencoders provide low-dimensional representations that can be used to efficiently solve high-dimensional numerical optimization problems. *Chapter 3.*

3. Moment-generating function of the improvement and expected improvement criterion prove to be excellent choices for robust Bayesian optimization, especially when dealing with high dimensionality. *Chapter 4.*

4. Mini-max robustness is the most efficient robustness criterion in terms of fixed budget and fixed target analyses. *Chapter 5.*

5. In numerical optimization problems, there can be multiple types of uncertainties present, particularly in the objectives and the constraints. As a result, the user needs to determine which type and structure of uncertainty to focus on, based on its potential impact.

6. Surrogate-assisted optimization provides an efficient mechanism to solve problems with uncertainty and noise in the search variables. This kind of uncertainty can be represented in a deterministic or a probabilistic fashion.

7. The notion of robustness can also be applied to areas such as machine learning and pattern recognition, particularly when dealing with uncertain data.

8. The scientific community requires a test suite for robust optimization problems to effectively validate and compare research findings in this field.

9. While practicing robust optimization in real-world situations, the hardest thing to achieve is the balance between performance and stability.

Sibghat Ullah
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