

**Robust optimization for computationally expensive systems  
With applications to integrated photonics**

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# Propositions

accompanying the dissertation

## **ROBUST OPTIMIZATION FOR COMPUTATIONALLY EXPENSIVE SYSTEMS**

WITH APPLICATIONS TO INTEGRATED PHOTONICS

by

**Samee UR REHMAN**

1. Although the notion of applying robust optimization on surrogate models may seem contradictory, the approach can prove to be highly effective in terms of efficient identification of robust designs.
2. The use of robust optimization should not be advocated under all circumstances.
3. In general, an adaptive sampling based approach should be preferred over a space-filling based method when robust optimization has to be performed on metamodels.
4. Problems affected by implementation error should be optimized using a different surrogate-based approach than problems affected by parametric uncertainties.
5. A surrogate-based optimization framework that optimizes multi-level problems has the potential to challenge the assumption that methods depending on metamodel construction cannot handle large problem sizes.
6. A designer requires minimal effort to generate robust designs of different complex integrated photonic systems once he/she has implemented the Bilevel Efficient Global Robust Optimization algorithm.
7. Building a working automated setup for measuring integrated photonic devices may turn into an exercise in optimizing all possible worst-case scenarios.
8. Focus and determination may be important prerequisites for a successful PhD but luck is an equally essential ingredient.
9. Humility is the single most valuable trait in a researcher.
10. Understanding the physical laws of nature does not give us the ability to govern the principles by which they operate.

These propositions are regarded as opposable and defensible, and have been approved as such by the supervisor prof. dr. F. van Keulen.

# **Stellingen**

behorende bij het proefschrift

## **ROBUST OPTIMIZATION FOR COMPUTATIONALLY EXPENSIVE SYSTEMS**

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door

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1. Stelling 1.
2. Stelling 2.
3. Stelling 3.
4. Stelling 4.
5. Stelling 5.
6. Stelling 6.
7. Stelling 7.
8. Stelling 8.
9. Stelling 9.
10. Stelling 10.

Deze stellingen worden opponeerbaar en verdedigbaar geacht en zijn als zodanig goedgekeurd door de promotor prof. dr. F. van Keulen.