# Article information:

Review of numerical optimization techniques for meta-device design [Invited]
[https://opg.optica.org/ome/fulltext.cfm?uri=ome-9-4-1842=407576](https://opg.optica.org/ome/fulltext.cfm?uri=ome-9-4-1842&id=407576)

# Article summary:

1. This article reviews numerical optimization techniques for meta-device design, such as genetic algorithms, Kriging surrogate models, and artificial neural networks.

2. Examples of applications of these techniques are given, such as the design of thermal cloaks, multi-band polarization independent 3D printed frequency selective structures, and nano antennas with two radiation modes.

3. The article also discusses the use of learning-by-examples techniques in electromagnetics and inverse design using artificial neural networks.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article provides a comprehensive review of numerical optimization techniques for meta-device design. It is well written and provides a clear overview of the various techniques discussed. The authors provide examples of applications to demonstrate how these techniques can be used in practice. However, there is no discussion on potential biases or sources of error that could arise from using these techniques. Additionally, there is no mention of any possible risks associated with using these techniques or any counterarguments that should be considered when applying them to meta-device design. Furthermore, the article does not present both sides equally; it only focuses on the advantages and potential applications of these numerical optimization techniques without exploring any potential drawbacks or limitations. As such, this article may be seen as biased towards promoting the use of these numerical optimization techniques for meta-device design without providing an unbiased assessment of their reliability and trustworthiness.

# Topics for further research:

* Numerical optimization techniques bias
* Risks associated with numerical optimization techniques
* Limitations of numerical optimization techniques
* Counterarguments for numerical optimization techniques
* Reliability of numerical optimization techniques
* Trustworthiness of numerical optimization techniques

# Report location:

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