Doctoral School of Information and Biomedical Technologies
Polish Academy of Sciences (TIB PAN)

SUBJECT: Computationally efficient algorithm for large-scale structural topology optimization subject to stress constraints

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DESCRIPTION:

In engineering practice, stresses have critical importance in assessing the strength of a structure [1]. Engineers' demands to construct ever larger and more complex structures are increasing. Therefore, the problem of topological optimization with stress constraints for large-scale models seems to be very important in modern engineering design [2].

The purpose of this PhD study will be development of computationally efficient algorithm for structural topology optimization under stress constraints. In recent years, a lot of attention has been devoted to compliance-based topology optimization [3] and as a result of this many approaches has been proposed such as Solid Isotropic Material with Penalization (SIMP), Bidirectional Evolutionary Structural Optimization (BESO) or Level sets, to mention a few. However, such approaches are not suitable for stress-constrained topology optimization which require specialized procedures to aggregate stress within certain neighborhood (so-called P-norm approach). As a result of the proposed PhD topic dedicated software for structural topology optimization will be developed.

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