Type: Minisymposium Contribution

Computing Multiple Local Minimizers of Topology Optimization Problems and Application for Hydrogen Electrolysis Cell Design

Thursday, August 15, 2024 11:00 AM (30 minutes)

Topology Optimization considers the optimization of a domain by changing its geometric properties by either adding or removing material. Typically, topology optimization problems feature multiple local minimizers. In order to guarantee convergence to local minimizers that perform best globally, it is important to identify multiple local minimizers of topology optimization problems. Moreover, finding local solutions that are desirable from an application standpoint due to easy manufacturability or aesthetic designs also requires the discovery of multiple local minimizers.

In this talk, we present a novel deflation approach to systematically find local minimizers of general topology optimization problems. The approach is based on a penalization of previously found local solutions in the objective. Through a series of examples, including the optimization of fluids in Stokes flow and the optimization of bipolar plates in hydrogen electrolysis cells, we demonstrate the effectiveness of our approach.

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