

## **Isogeometric topology optimization with adaptive surface and curve filtering**

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Main feature of isogeometric topology optimization is spline basis for modeling, FE analysis and design optimization. It uses control points on NURBS (Non-Uniform Rational B-Spline) surfaces and changes in topology are illustrated by inserting or merging of trimming curves. Similar to the conventional FE node-based shape optimization, jagged or oscillating boundaries may appear in isogeometric topology optimization due to the similarities in design variables. However, these problems can be resolved by using filtering techniques which are applied to non-parametric shape optimization. In this research, Gaussian filter is applied to boundaries on NURBS surface and trimming curves to compute the filtered locations of control points. During the optimization process, values on filtering parameters will be adaptively adjusted since preferred values on these parameters are depending on the stage of optimization. Therefore, proper functions on filtering parameters are developed and proposed approaches are applied to some benchmarking topology optimization problems.

**Keywords:** Isogeometric analysis, Trimmed surface analysis, Topology optimization, NURBS, Surface and curve filters