Effect of different isogeometrical methodologies on topological structural optimization

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Abstract:

The outcome of the structural topology optimization is clearly affected by the employed analysis method within the optimization process, e.g. the IsoGeomtric analysis (IGA) or the Finite Element Method (FEM). Furthermore, different methodologies can be followed for implementation of the potential capabilities of IGA for topological optimization of two and three dimensional structures. These approaches can vary based on the way they define the material model and its variation the employed penalization technique for prevention of formation of porous media as well as the employed optimization technique such as Optimality Criteria (OC) or the Method of Moving Asymptotes (MMA). A comparative study of these different approaches by presenting examples from two and three dimensional problems is the subject of this paper.