A Non-Linear OC Multigrid Topology Optimization Scheme

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Multigrid techniques for topology optimization are often limited to the process of solving the linear elasticity state equation. Within the context of optimization, rather than simulation, multigrid methods are usually also used in a linear fashion when solving the KKT-system arising from the necessary optimality conditions.

A very popular method to solve topology optimization problems is the non-linear optimality criteria method (OC), which is not directly based on the KKT-system and therefore usually not in the scope of classical multigrid methods in the context.

We present a novel approach to multigrid techniques within topology optimization which are based on the non-linear OC-scheme and can therefore be used nicely to accelerate a given topology optimization solver without the need to change the whole optimization scheme to a classical KKT-based method.