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NEW MANUFACTURING CONSTRAINT CAPABILITIES IN PROJECTION-BASED TOPOLOGY OPTIMIZATION

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Topology optimization is a computational design tool capable of identifying optimal phase connectivity across a design domain. This domain is typically discretized using finite elements and the goal is identify the material phase to be located within each elemental domain - element phase is thus the physical design variable. Projection-based algorithms are arising as a powerful tool for solving topology optimization problems. They use independent design variables that are projected onto element space to create structure topology. Certain properties, such as feature length scale, can be achieved implicitly by tailoring the relationship between the independent and physical design variables. This is a powerful property and offers a means for designers to impose design specifications implicitly, without formal optimization constraints.

This paper discusses latest projection-based algorithmic advancements as related to manufacturing restrictions. Topics to be discussed include improved multiphase minimum and maximum length scale control, discrete object project, 3D milling constraints, multimesh formulations.