Matlab code for topology optimization in arbitrary 3D domains

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ABSTRACT

To utilize topology optimization in industrial fields, this paper proposes topology optimization code that can handle arbitrary 3D domains. The manufacturing process of topology optimization results derived from step file is shown in Fig 1. Gmsh, open source 3D finite element mesh generator, is used for implementation of topology optimization in arbitrary 3D domains. Based on imported geometries from step files, all procedures in pre-processing are integrated in gmsh. And, mesh information generated by gmsh is converted into appropriate matrices in Matlab. After the conversion process, node-based topology optimization for compliance minimization is implemented. After the optimization process is completed, the iso-surface of topology optimization result is automatically converted into stl file. Finally, topology optimization results are manufactured by 3D printer without additional post-processing. This code can contribute to invigoration of topology optimization in diverse industries.
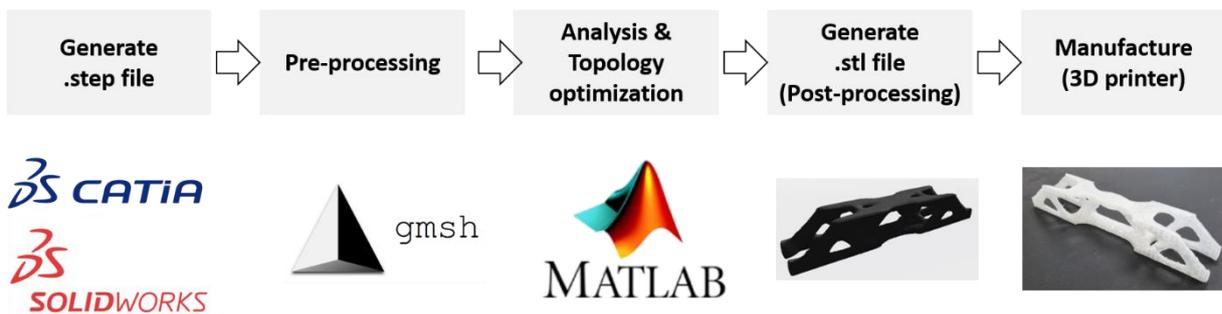
Fig. 1 The flowchart of manufacturing process of topology optimization result derived from step file

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