

We present a general topology optimization framework in Matlab, named PolyTop, using unstructured polygonal finite element meshes. The topology optimization code is structured in a modular fashion to separate the analysis routine from the particular formulation used. Therefore, the finite element and sensitivity analysis routines contain no information related to the formulation and thus can be extended, developed and modified independently. In addition, we also present a robust Matlab implementation for polygonal mesh generation, named PolyMesher, that relies on an implicit description of the domain geometry. This work is based on the concept of Voronoi diagrams, which offer an effective scheme to discretize two-dimensional geometries with complex domains. We remark that polygonal finite elements outperform linear triangles and quads in the field of topology optimization because they are not susceptible to numerical instabilities such as checkerboard patterns. Representative examples are provided to illustrate the capabilities of the framework composed by PolyTop and PolyMesher.