

# Quad-dominant Patch Replacement Based Clean-up

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Quadrilateral mesh generation methods usually include a topological clean-up step to maximize the quality of mesh. Non-local clean-up operations have shown a superior ability to increase the regularity of meshes. State-of-the-art approaches rely on the input mesh containing only quad elements. We propose a new method of mesh clean-up by patch replacement that extends the work of Verma & Tautges to work for quad-dominant meshes. We generalize the definition of singularities to include triangle elements and extend the definition of convex patches which was key to their patch replacement method. By introducing new patterns which now contain triangles, we are able to obtain results on the same level as previously done with all-quad meshes, but now on meshes containing isolated triangles. Our method minimizes the number of triangles, and places them in ideal locations, similarly to where it would originally would have placed the singularities. This is compatible with large transitions in mesh sizing and produces meshes well-suited for CFD and other applications.

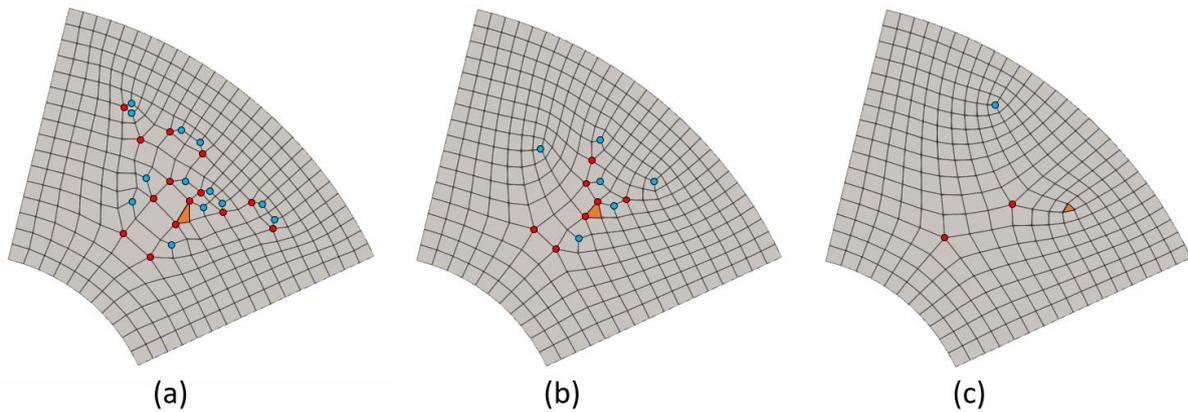


Figure 1: (a) Mesh generated using an advancing front approach. (b) Mesh after the clean-up algorithm of Verma & Tautges that ignores triangle elements. (c) Mesh after our clean-up procedure.