

# CONSTRUCTION OF AN OBJECTIVE FUNCTION FOR OPTIMIZATION BASED SMOOTHING FOR SURFACE MESHING

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An objective function for optimization based smoothing is proposed for both linear and quadratic triangular and quadrilateral elements. Unlike the current popular approach, which separates untangling and smoothing into two processes, the new approach is able to untangle as well as smooth the mesh. In addition, the objective function is designed in such a way that it is easy and straightforward to extend it to higher order elements. The higher order continuous derivatives of this objective function behave quite well for optimization techniques. The objective function is also constructed such that it has only one minimum. This has been proven empirically. With judicious use of optimization based smoothing, our combined Laplacian/Optimization smoothing scheme converges with fewer iterations and much higher quality without sacrificing speed.

Key words: surface mesh, optimization based smoothing, objective function, quadratic elements