

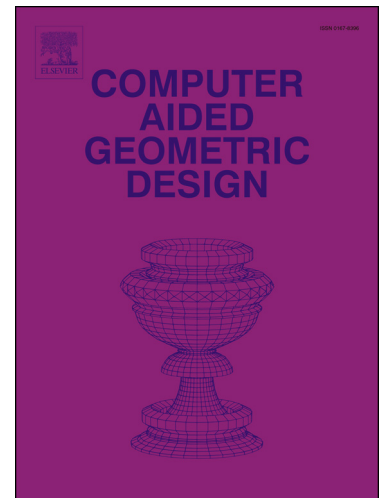
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# Optimal Base Complexes for Quadrilateral Meshes

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## Abstract

In this paper we give an explicit algorithm to optimize the global structure of quadrilateral meshes i.e base complexes, using a graph perfect matching. The approach consists of constructing a special graph over the singularity set of the mesh and finding all quadrilateral based complex subgraphs of that graph. We show by construction that there is always an optimal base complex to a given quadrilateral mesh relative to coarseness versus geometry awareness. Local structures of the mesh induce extra constraints which have been previously ignored but can give a completely different layout. These are diagonal, multiple and close to zero length edges. We give an efficient solution to solve these problems and improve the computation speed. Generally all base complex optimization schemes are bounded by the topology of the singularities, we explore the space of layouts encoded in the graph to identify removable singularities of the mesh while simultaneously optimize the base complex.

*Keywords:*

quadrilateral meshes, quad layouts, base domain, graph matching, binary optimization

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