Figure 97: Paving algorithm

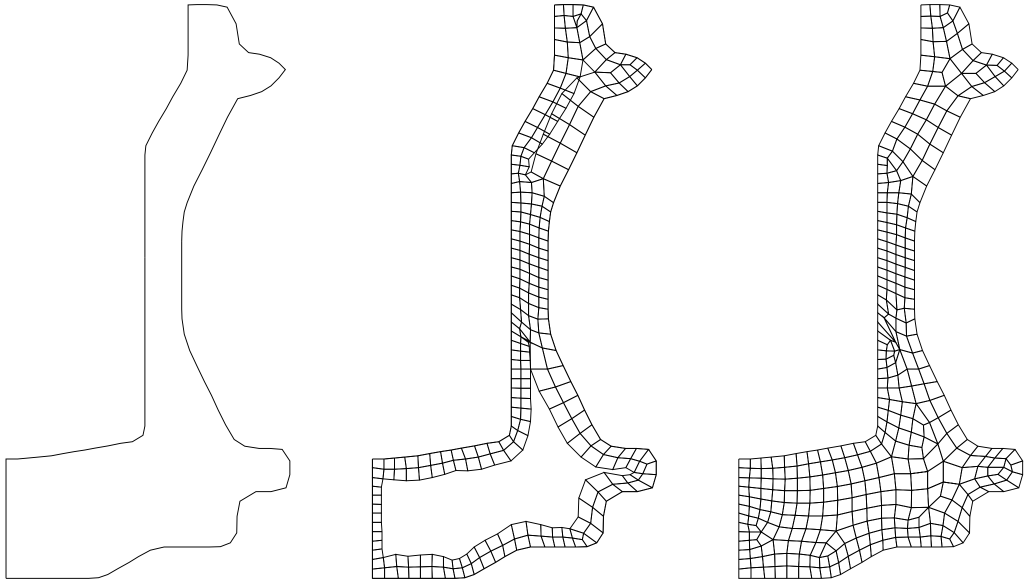
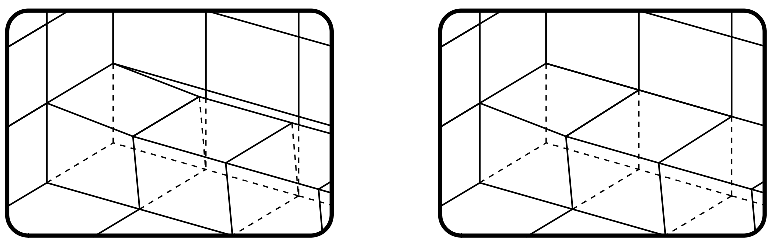


Figure 98: Plastering algorithm



meshes must be isomorphic in order to seam them. This condition is unlikely to hold for practical problems. Another problem is that the cavities cannot be meshed in every case. Fig. 2 shows an example (the cavity can be reduced to an octahedron, a non-meshable object in the sense that a valid hex mesh that matches the octahedron surface has not yet been found).

It turns out that generating a hex mesh from a surface discretization is hard to realize if the decisions are made purely on local information. So the original idea was rejected, and global information was incorporated using the concept of the dual described in chapter 4.

An algorithm for the generation of hexahedral element meshes for very complicated domains (geological structures with internal boundaries) was proposed by Taniguchi [Taniguchi 1996]. His approach is similar to Armstrong's algorithm in that he decomposes the domain into simple subvolumes (tetrahedra, pentahedra, etc.) that are then meshed separately. The method is based on Delaunay triangulation, and, therefore can be applied for arbitrary convex domains which consist of a set of convex subdomains that are surrounded by fracture planes. Fig. 99 shows a mesh generated for the simulation of groundwater flow; for simulations like this it is very important that the boundaries between different layers of material are present in the mesh. The method has recently been extended [Kasper et. al. 1998].

A similar method for hexahedral element meshing of mechanical parts was proposed