

MANIPULATING HOLE SYSTEMS

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We want to reconstruct the shape of a point cloud, with focus on the holes of the resulting model. In many cases, the Alpha complex of appropriate scale gives a good reconstruction. However, in some applications the holes of the model are important and there is no scale of the Alpha complex that gives a satisfactory result. We define operations to change the birth and death of holes in a filtered simplicial complex, i.e., they open or close holes in a subcomplex of a fixed scale. Manipulating a hole can have side effects on other holes. We study the dependences between holes, which enables us to predict or counteract these side effects.
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