

Deterministic dimension independent mesh generation

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1 Design

In this section, we describe the basic design of the meshing algorithm.

1.1 Requirements

When using finite element method, one usually use an adaptive variable size discretization of the space in order to handle different geometries with different precision requirement. This is very important in order to avoid using the highest grid resolution for the whole problem and to reduce the size of the final linear system to solve. In order to support this, we would like our meshing algorithm to handle arbitrary geometry constraint with arbitrary spacially varying meshing density. Since separate space can be discretized independently, we can assume the space is connected. However, it is not restricted to be singly connected in order to support problems with inner surfaces.

In addition to these basic requirements, we would like to handle meshing of curved space with the same algorithm. This is useful to solve problems on a geometry embedded in a higher dimensional space, e.g. a curved surface in three-dimensional space.

1.2 Abstraction of the model

2 Implementation

3 Results and future improvements





