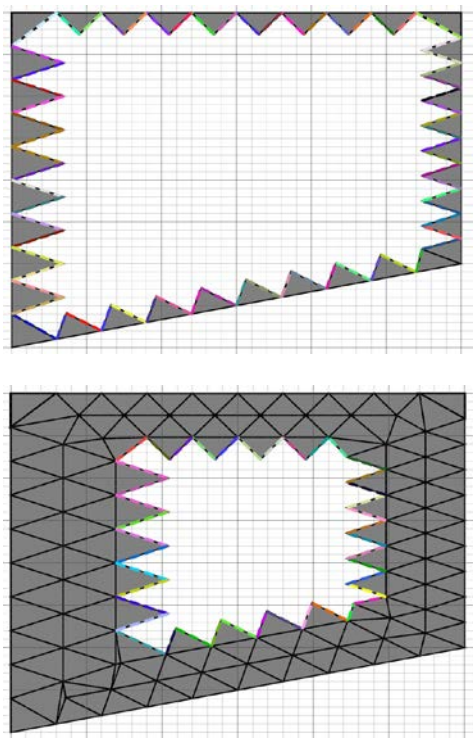
Chair for Computation in Engineering
Department of Geo, Civil and Environmental Engineering
Technical University of Munich

Modeling: ★★★☆☆
Mathematics: ★★★☆☆
Programming: ★★☆☆☆
Science: ★★★★☆

Software Lab:

Automatic mesh generator in a python environment



Setting

The “Theory of Plates” Python Tool (ToP) of the chair of Structural Analysis provides the possibility to do a Finite Element analysis of plates in bending and of plates in membrane action. So far only simple quadrilaterals can be used to mesh 4 sided geometries. The aim of this project it to create the possibility of analyzing arbitrary shapes. To do so an automatic mesh generator must be implemented in the python environment of ToP (e.g. “advancing front” [1]).

As there are only triangular finite elements implemented the students must rewrite the existing elements to quadrilateral elements.

An advanced goal of this work is the investigation of meshing arbitrary shapes with the help of quadrilateral elements (e.g. Trimming).

Task

- Create a python tool that lets users discretize arbitrary shapes with triangular elements
- Rewrite existing 4-node elements to 3-node elements (plates in membrane action & plates in bending)
- Investigate possibilities to deal with quadrilateral elements (e.g. Trimming)

Supervisors

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References

[1] P.L. George, Automatic mesh generation – Application to Finite Element Methods, Wiley 1991