

Masterarbeit/Master Thesis:

Formulation of a Shell Element for Isogeometric Analysis with Subdivision Surfaces

Subdivision surfaces (SubD) are largely used in computer visualization but are gaining ever more prominence in computer aided design (CAD). Due to their ability to represent smooth surfaces with arbitrary topology they seem more advantageous compared to traditionally used NURBS. The latter pose complications when working with complex topologies. SubD are simply defined by their control mesh and a subdivision scheme and are inherently watertight, which motivates the application of SubD in the field of IGA. In order to enable the usage of SubD for IGA, an appropriate shell element formulation shall be formulated, implemented and tested on meaningful examples. The steps for completing this task are:

- Literature review of SubD variants and existing IGA with SubD.
- Implementation of a thin shell element.
- Check results on existing benchmark tests.

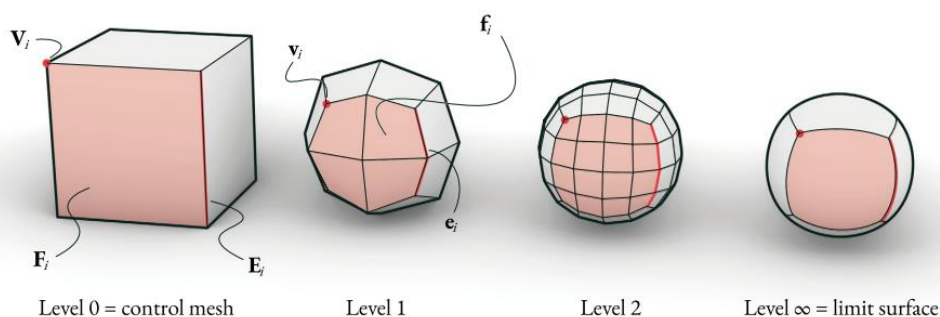


Figure: Subdivision scheme depicted on the example of the Catmull-Clark scheme. [1]

Some basic knowledge on theory of shells and IGA is beneficial and basic knowledge in C++ and Python are essential for the implementation in the open-source framework Kratos Multiphysics.

[1] Oberbichler, T. and Bletzinger, K.U., 2022. CAD-integrated form-finding of structural membranes using extended catmull-clark subdivision surfaces. *Computer-Aided Design*, 151, p.103360.

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Bearbeitungs-

Sprache:

Starttermin:

Deutsch oder Englisch
variabel