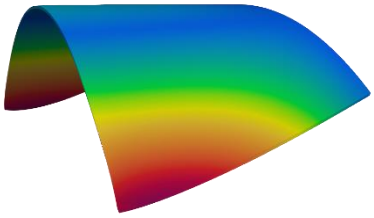
Lehrstuhl für Baustatik und Baudynamik | RWTH AACHEN UNIVERSITY

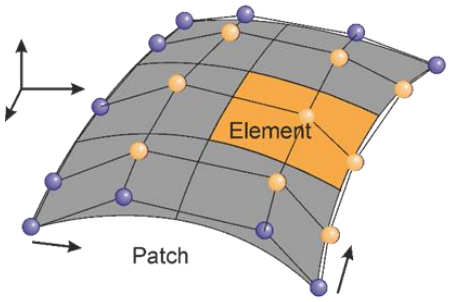
Master Thesis

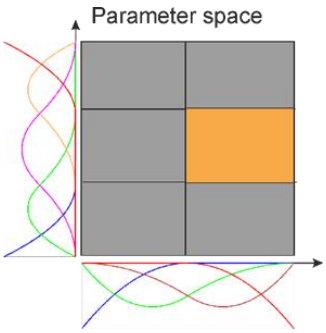
Implementation of a dynamic formulation for an SBIGA shell

Background

In modern civil engineering applications, shell formulations are proposed to describe the mechanical behavior of thin and curved structures such as hulls of satellites or roofs of buildings. Most commonly, the finite element method (FEM) is used to derive the stiffness and mass matrix of the structure. In the recent years, a novel approach called scaled boundary method (SBM) has been proposed. The main idea is a scale separation where the in-plane direction is approximated by basis functions, but for the thickness direction the analytical solution is applied. By use of NURBS and B-splines as basis functions in the framework of isogeometric analysis (IGA), the shell formulation is called isogeometric scaled boundary formulation (SBIGA). This SBIGA shell is already derived for structural analysis and will be extended to applications of structural dynamics in this thesis.







Aim

The goal of this thesis is the implementation and numerical investigation of a dynamic formulation for the SBIGA shell. The accuracy and efficiency of the formulation should be evaluated based on several numerical examples. A sample of dynamical shell problems needs to be found in literature. The thesis can be written in German or English.

Contact

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