



Isogeometric Analysis and Shape Optimal Design of Shell Structures

By Josef Kiendl

Shaker Verlag Jun 2011, 2011. Taschenbuch. Book Condition: Neu. 211x152x12 mm. Neuware - Isogeometric analysis is a new method of computational analysis with the goal of merging design and analysis into one model by using a unified geometric representation. NURBS (Non-Uniform Rational B-Splines) are the most widespread technology in today's CAD modeling tools and therefore are adopted as basis functions for analysis. In this thesis, the isogeometric concept is applied to the analysis and shape optimization of shell structures. A new, rotation-free shell element is developed, using the Kirchhoff-Love shell theory and NURBS as basis functions. NURBSbased analysis provides advantages especially for shells, since the structural behavior of a shell is mainly determined by its geometry and therefore a good geometric description is essential. Furthermore, due to the exact geometry description with NURBS, curvatures can be evaluated directly on the surface without rotational degrees of freedom or nodal directors. Different examples show the good performance and accuracy of the method, for geometrically linear and nonlinear problems. Aspects concerning boundary conditions and the treatment of multiple patch structures are investigated, and solutions are proposed which allow the use of this method for a broad variety of problems. Furthermore, the developed shell...



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