Kolloquium Angewandte Mathematik
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der Bundeswehr
Universität **München**

Vortragsankündigung

Am **Mittwoch, dem 06.02.2013,** hält **um 17.00 Uhr**

Herr **Prof. Dr. Ariel Lombardi**
(Universidad de Buenos Aires)

einen Vortrag über das Thema

An introduction to Isogeometric Analysis and some related B-splines interpolation results

Der Vortrag findet im **Raum 1116** in **Gebäude 150** statt.

Abstract

Isogeometric analysis based on NURBS (non-uniform rational B-splines) was introduced in [2], with the aim of improving the connection between numerical simulation of physical phenomena and the Computer Aided Design (CAD) system. Indeed, one of its most important features, is to eliminate (or at least to reduce) the approximation of the computational domain and the re-meshing by the use of the "exact" geometry directly on the coarsest level of the discretization. This is achieved by using B-splines or NURBS for the geometry description as well as for the representation of the unknown fields, combined with the classical isoparametric concepts of the finite element method.

In this talk we will review the basic definitions and geometric properties of B-splines and NURBS [4, 3], and how to use them for the approximation of elliptic problems in the context of Isogeometric Analysis. We will also briefly review the known error analysis [1] for this kind of approximations. Finally we will show some preliminary results on B-splines quasi-interpolation which can be useful to allow the use of anisotropic parametric meshes in the Isogeometric approach. Situations in which the use of parametric meshes with narrow elements is needed can appear for example when the solution to be approximated contains sharp gradients, like boundary or internal layers. This is the case of singularly perturbed reaction-convection-diffusion equations. Other situations can appear related to the map that applies the parametric domain onto the physical one: in order to obtain a quasi-uniform subdivision of the physical domain, it may happen that a mesh with some refined regions is necessary in the parametric domain.

Literatur

[1] Y. Bazilevs, L. Beirão da Veiga, J. A. Cottrell, T. J. R. Hughes, G. Sangalli, *Isogeometric Analysis: approximation, stability and error estimates for h-refined meshes.* Math. Models Meth. Appl. Sci. 16, 1031–1090, 2006.

[2] T. J. R. Hughes, J. A. Cottrell, Y. Bazilevs, *Isogeometric analysis: CAD, finite elements, NURBS, exact geometry, and mesh refinement.* Comp. Meth. Appl. Mech. Engrg. 194, 4135–4195, 2005.

[3] L. Piegl, W. Tiller, The Nurbs Book. Monograph in Visual Communication. Springer, Berlin, 1996

[4] L.L. Schumaker, Spline Functions: Basic Theory. Cambridge University Press, Cambridge, 2007.

Alle Interessierten sind dazu herzlich eingeladen.