A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Montag, 20. März 2017, 11.00 Uhr

Ort: Seminarraum 108/109, Arnimallee 6, 14195 Berlin

Disputation über die Doktorarbeit von

Herrn Konstantin Poelke

Thema der Dissertation:

Hodge-Type Decompositions for Piecewise Constant Vector Fields on Simplicial Surfaces and Solids with Boundary

Thema der Disputation:

Discrete Poincaré Duality Angles

Die Arbeit wurde unter der Betreuung von **Prof. Dr. K. Polthier** durchgeführt.

Abstract: On a compact, orientable smooth manifold without boundary the space of harmonic k-forms can be considered as a concrete representation of the k-th singular cohomology with real coefficients, which is a consequence of a classical theorem by de Rham. In the presence of a boundary, though, this space becomes infinite-dimensional and the linkage to the topology is lost. Still, there are finite-dimensional subspaces of so-called Dirichlet and Neumann forms, isomorphic to the relative and absolute cohomology, respectively.

A recent result by deTurck, Gluck and Shonkwiler identifies the principal angles between these two spaces -- coined the Poincaré duality angles -- as a significant intrinsic characteristic of manifolds with boundary, which relates the influence of the boundary components to the "inner" topology of the manifold.

In this talk I will introduce and discuss the Poincaré duality angles for a discrete version of harmonic Neumann and Dirichlet fields on triangulated surfaces with boundary, accompanied by some numerical examples which illustrate this concept.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission

Prof. Dr. K. Polthier