

A U S H A N G

FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

DISPUTATION

Montag, 10. Juli 2017, 13.00 Uhr

Ort: Raum 108, Arnimallee 6, 14195 Berlin

Disputation über die Doktorarbeit von

Herrn Mark Schlutow

Thema der Dissertation:

**Finite-amplitude gravity waves in the atmosphere:
traveling wave solutions and stability**

Thema der Disputation:

Optimal sailing routes

Die Arbeit wurde unter der Betreuung von **Prof. Dr.-Ing. R. Klein** durchgeführt.

Abstract: Finding the trajectory with shortest time (Ancient Greek: brákhistos khrónos) for a body moving from one point to another under a given force dates back to the year 1696, when Johan Bernoulli posed his famous Brachistochrone problem. His Brother, Jakob Bernoulli, Isaac Newton, Gottfried Leibniz, Guillaume de l'Hôpital, and other great minds of this time were attracted by this problem and proposed solutions that lead to the development of calculus of variations and optimal control.

Sailboats can go in any direction except directly upwind. Their velocity depends on the angle to the wind. Given a spatially heterogeneous wind field, the starting, and the end point, I want to present, how the sailboat's Brachistochrone, i.e. the fastest course, can be computed numerically with the help of a typical on-board low-performance computer. The method uses multi-splines as a discretization of space which translates the task into a graph search problem. With the aid of parallelization and mesh refinement techniques, a fast and reliable algorithm is obtained.

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.-Ing. R. Klein