A U S H A N G

FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

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D I S P U T A T I O N

Donnerstag, 04.05.2023, 14:00 Uhr

Ort: Seminarraum 108/109
(Fachbereich Mathematik und Informatik, Arnimallee 6,14195 Berlin)

Disputation über die Doktorarbeit von

Herrn Martin Stahn

Thema der Dissertation:
Augmented Generators for Non-autonomous Flows

Thema der Disputation:
Data-driven discretization of the dynamic Laplacian

Die Arbeit wurde unter der Betreuung von **Prof. Dr. P. Koltai** durchgeführt.

Abstract: The dynamic Laplacian originates from the theory of dynamical isoperimetry. Dynamical isoperimetry considers isoperimetry problems on manifolds that are subject to actions of possibly nonlinear dynamical systems. The dynamic Laplacian has been successfully used to study the mass transport in complex dynamical systems including coherent set analysis. It has been related to other mathematical objects such as Lagrangian diffusion. There is a classical Ulam and finite-difference type discretization, which is motivated from the perspective of the underlying dynamical system. There is also a radial basis function discretization with the typical advantages and disadvantages of this approach. We discuss some data-driven discretization schemes that utilize trajectory data, which is a commonly available in real world dynamical systems. The time-averaged diffusion map approach and the finite-element approach are compared using the example of Rayleigh-Bénard convection. These schemes are very well suited for sparse, incomplete, or noisy data, and provide interesting convergence results.

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. P. Koltai