Philipps Universität Marburg

Im Rahmen des **Promotionsprogramm**

„Data Science: Mathematical Analysis, Scalable Algorithms, and Systems"

wird

Frau Prof. Dr. Gabriele Steidl, TU Kaiserlautern,

am **Mittwoch**, 19. Februar 2020,

zum Thema

„Curve Based Approximation of Measures on Manifolds by Discrepancy Minimization"

vortragen.

Abstract.

The approximation of probability measures on compact metric spaces and in particular on Riemannian manifolds by atomic or empirical ones is a classical task in approximation and complexity theory with a wide range of applications. Instead of point measures we are concerned with the approximation by measures supported on Lipschitz curves. Special attention is paid to push-forward measures of Lebesgue measures on the interval by such curves. Using the discrepancy as distance between measures, we prove optimal approximation rates in terms of Lipschitz constants of curves. Having established the theoretical convergence rates, we are interested in the numerical minimization of the discrepancy between a given probability measure and the set of push-forward measures of Lebesgue measures on the interval by Lipschitz curves. We present numerical examples for measures on the 2- and 3-dimensional torus, the 2-sphere, the rotation group in 3D and the Grassmannian of all 2-dimensional linear subspaces of the four-dimensional Euclidean space.

Our algorithm of choice is a conjugate gradient method on these manifolds which incorporates second-order information. For efficiently computing the gradients and the Hessians within the algorithm, we approximate the given measures by truncated Fourier series and use fast Fourier transform techniques on these manifolds Joint work with M. Ehler, M. Gräf and S. Neumayer.

Der Vortrag findet um **16:30 Uhr** im **HS IV, 04A30,** am Fachbereich Mathematik und Informatik, Lahnberge, statt.

Kaffee/Tee im SR VII, 05D01, um 16:00 Uhr.

Es laden ein die Dozenten des

Promotionsprogramms