復旦大學
FUDAN UNIVERSITY

Applied Math
Ph.D. Seminar

A fast solver for the endpoint geodesic problem on Stiefel manifold with the canonical metric

Speaker: Zhifeng Deng (Florida State Univ.)

Time: 2024-06-13, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Kyle Gallivan (Florida State Univ.)

Abstract: In this presentation, we investigate the endpoint geodesic problem on the Stiefel manifold that seeks a constrained rotation joining two orthonormal $\mathbb{R}^{n\times k}$ matrices. A local diffeomorphism between the special orthogonal group and the skew symmetric matrices is constructed to characterize a quotient structure. Based on this geometric insight, a novel and robust Newton solver is proposed. Data structures and routines are developed to guarantee the superior performance of the proposed algorithm over the state-of-the-art algorithm. For further separated matrices, the speedup is at the scale of $8 \sim 10$.