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Area-Preserving Surface Parameterizations via Riemannian Optimization

Wednesday, 28 January 2026 10:45 (30 minutes)

I will present two recent works, coauthored with Mei-Heng Yueh, in which we propose Riemannian optimization algorithms for computing spherical and toroidal area-preserving mappings of genus-zero and genus-one closed surfaces, respectively. The proposed framework is based on retraction-based Riemannian optimization, which provides an effective way to handle the geometric constraints of the problem.
I will first introduce the main components of the Riemannian optimization framework and discuss the objective function and underlying geometry. I will then present numerical experiments on several mesh models, demonstrating the effectiveness of the proposed approach compared with existing state-of-the-art methods for computing area-preserving mappings. Finally, I will illustrate applications of the proposed algorithms to landmark-aligned surface registration and texture mapping.

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