

國立中山大學應用數學系

學術演講

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講題：Discrete Laplacian: Geometric Optimality and Steiner--Type Curvature

時間：2025/9/25 (Thursday) 15:30 ~ 16:30

地點：理 SC 4009-1 教室

茶會：15:00

Abstract

In this talk, I will explore the role of discrete Laplacians in geometry processing and numerical simulation, with an emphasis on their transition from smooth to discrete settings. I will compare primal and dual constructions and then extend these ideas to tetrahedral meshes. A central theme is that, unlike the primal version, the dual Laplacian naturally satisfies the Euler–Lagrange equation of the Dirichlet energy, providing a variationally justified operator.

For tetrahedral mesh, the dual Laplacian can be decomposed into two parts: a face-based Laplacian and a discrete mean curvature term. This curvature admits a variational interpretation analogous to the Steiner formula for polyhedral volumes, identified as a Steiner-type curvature. It captures the sensitivity of the Dirichlet energy to edge bending. Compared to primal constructions, the dual Laplacian demonstrates greater responsiveness to local mesh changes, improving geometric fidelity in deformation and refinement tasks.

敬 請 公 告 ！ 歡 迎 參 加 ！

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